IRON & COAL

THE IRON AND COAL TRADES' REVIEW

VOL. 182
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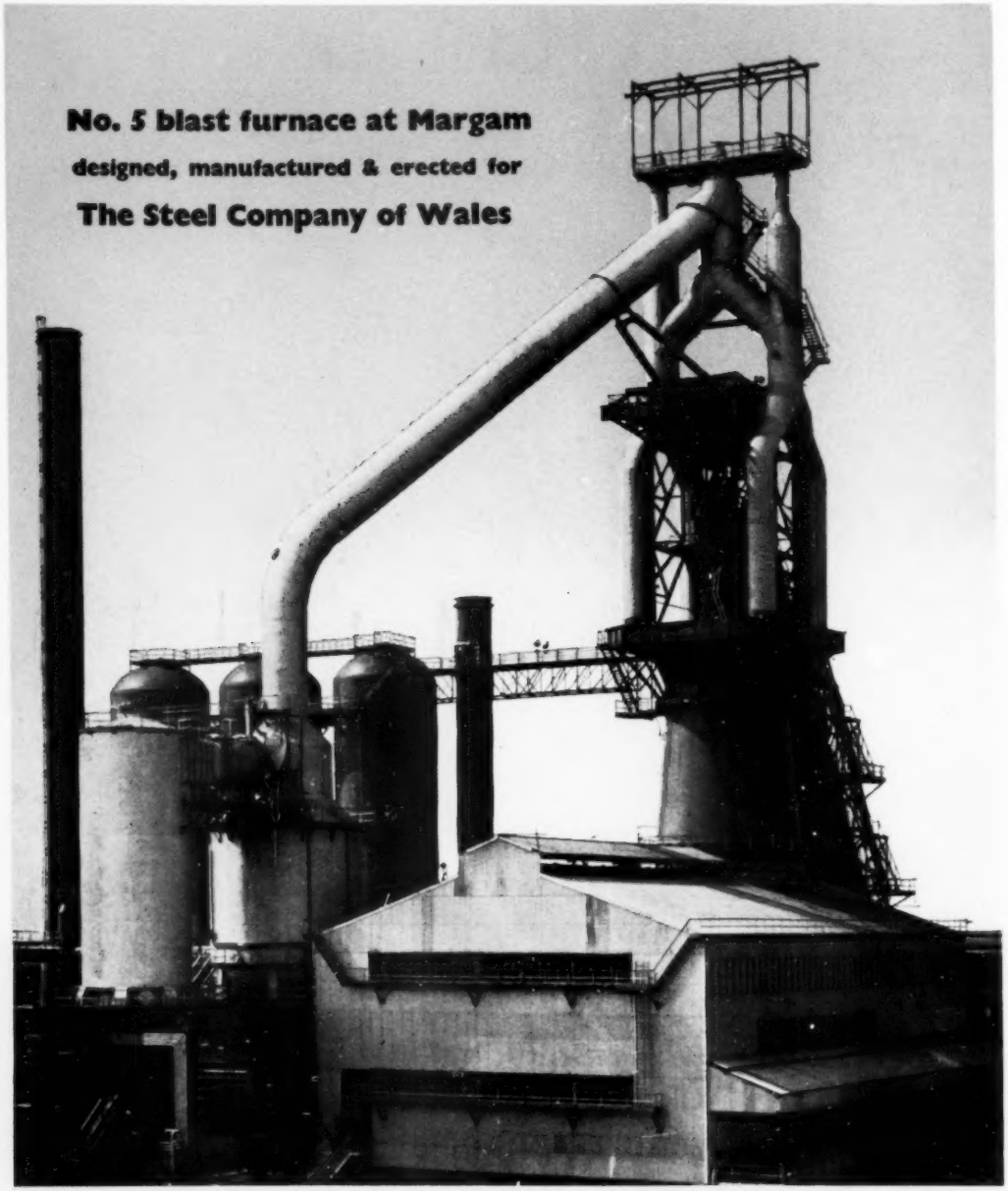

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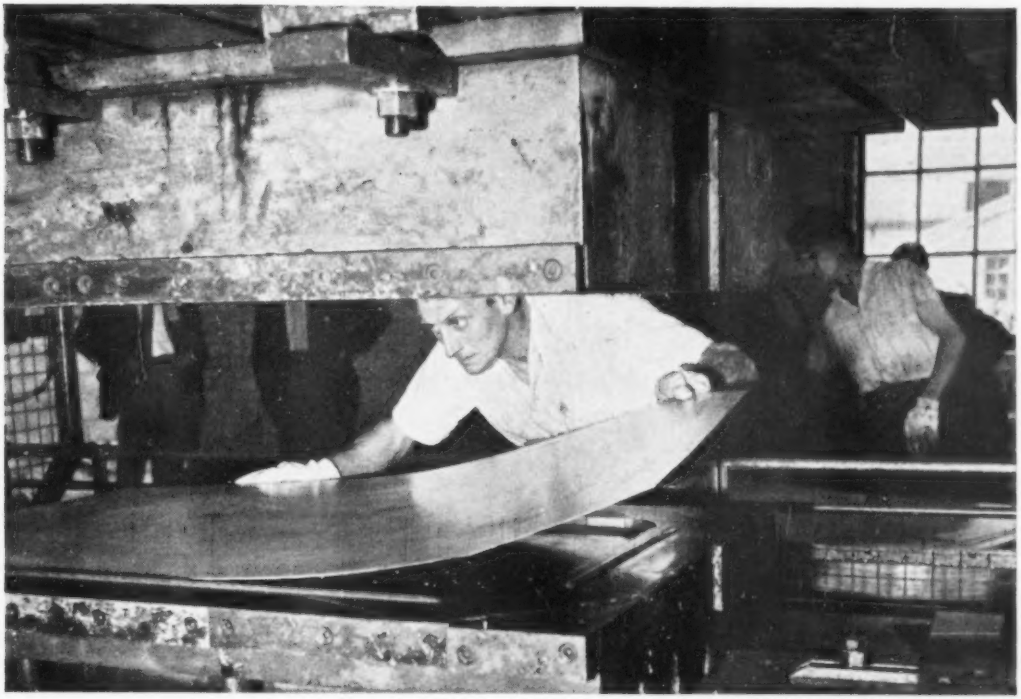

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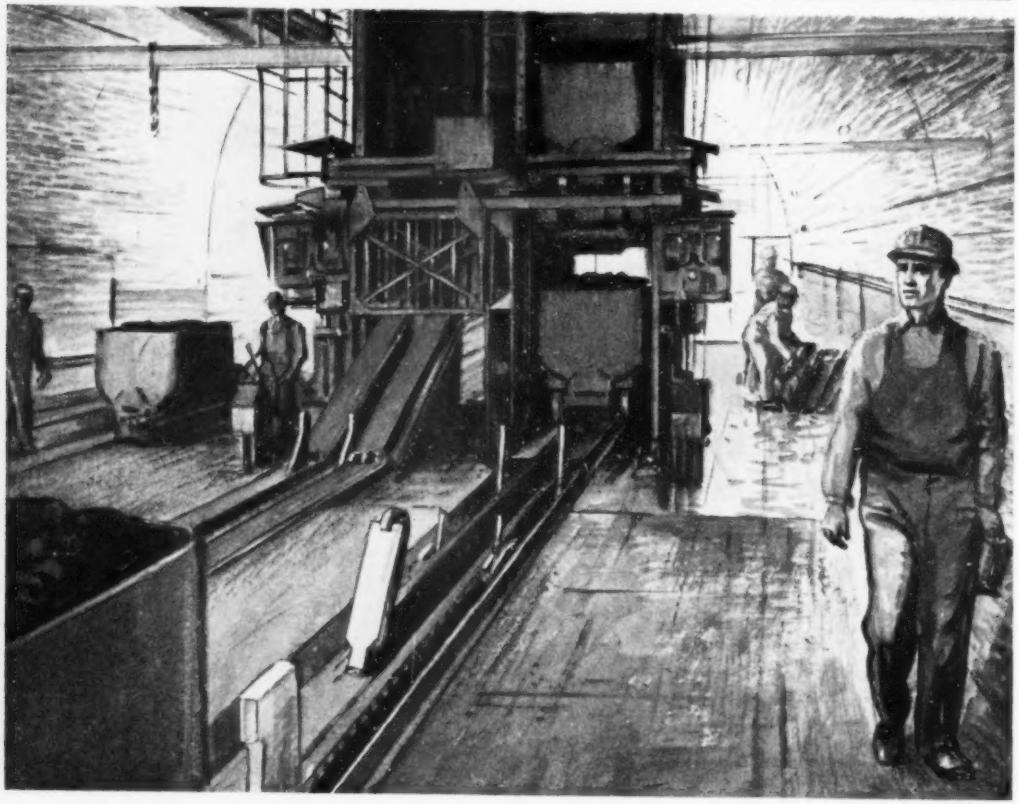

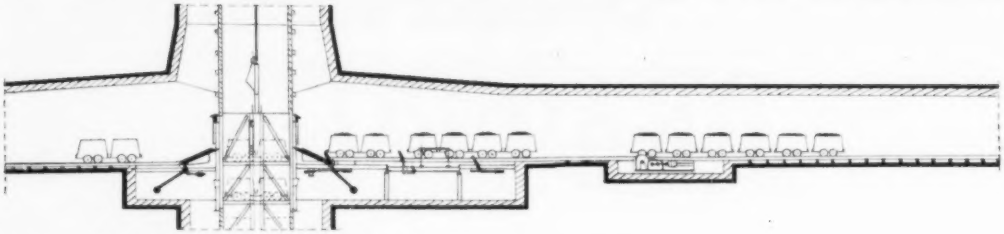

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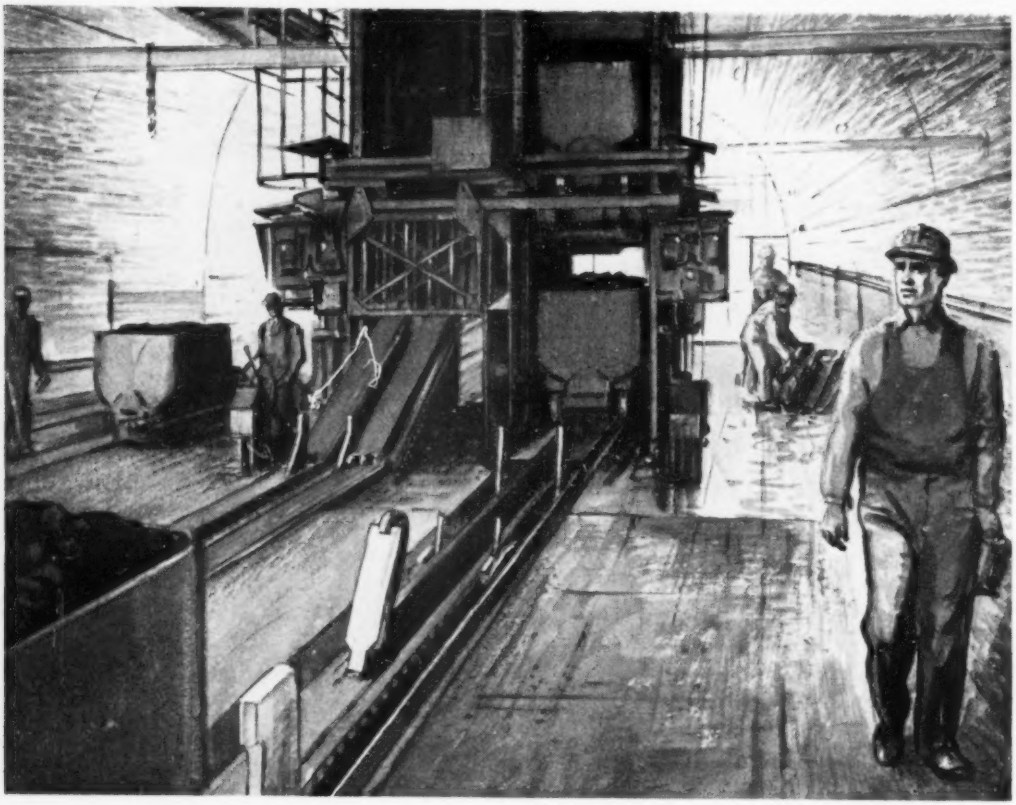

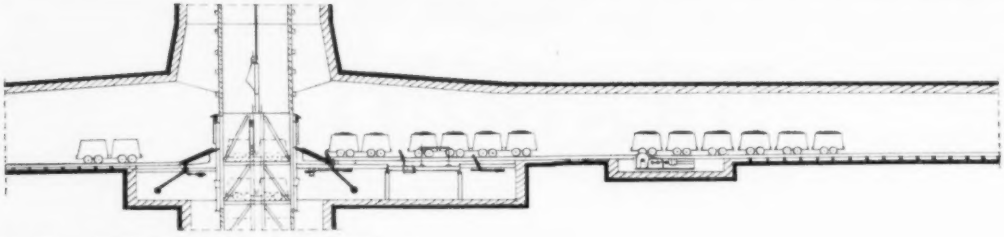

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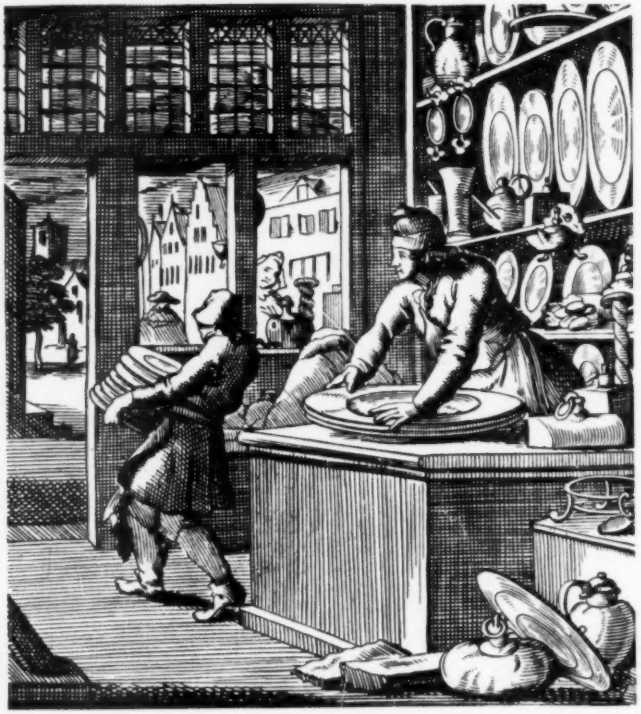

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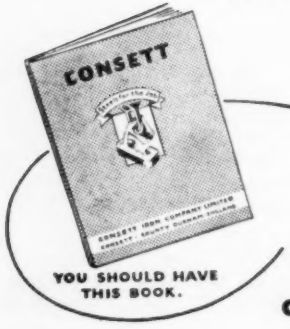

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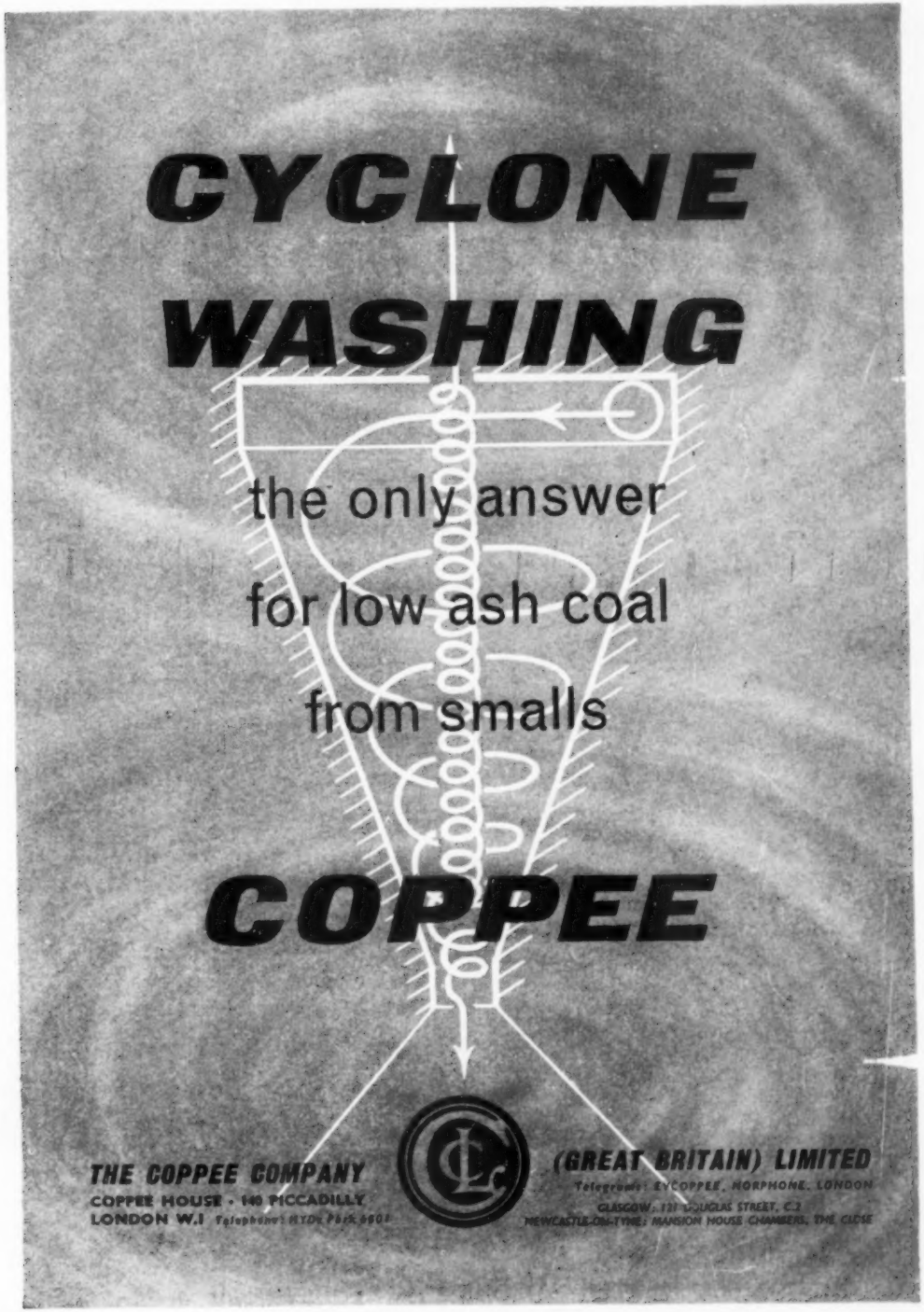
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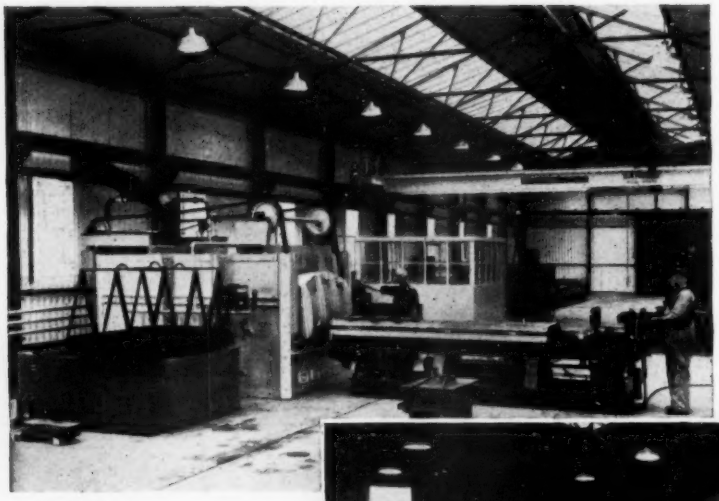

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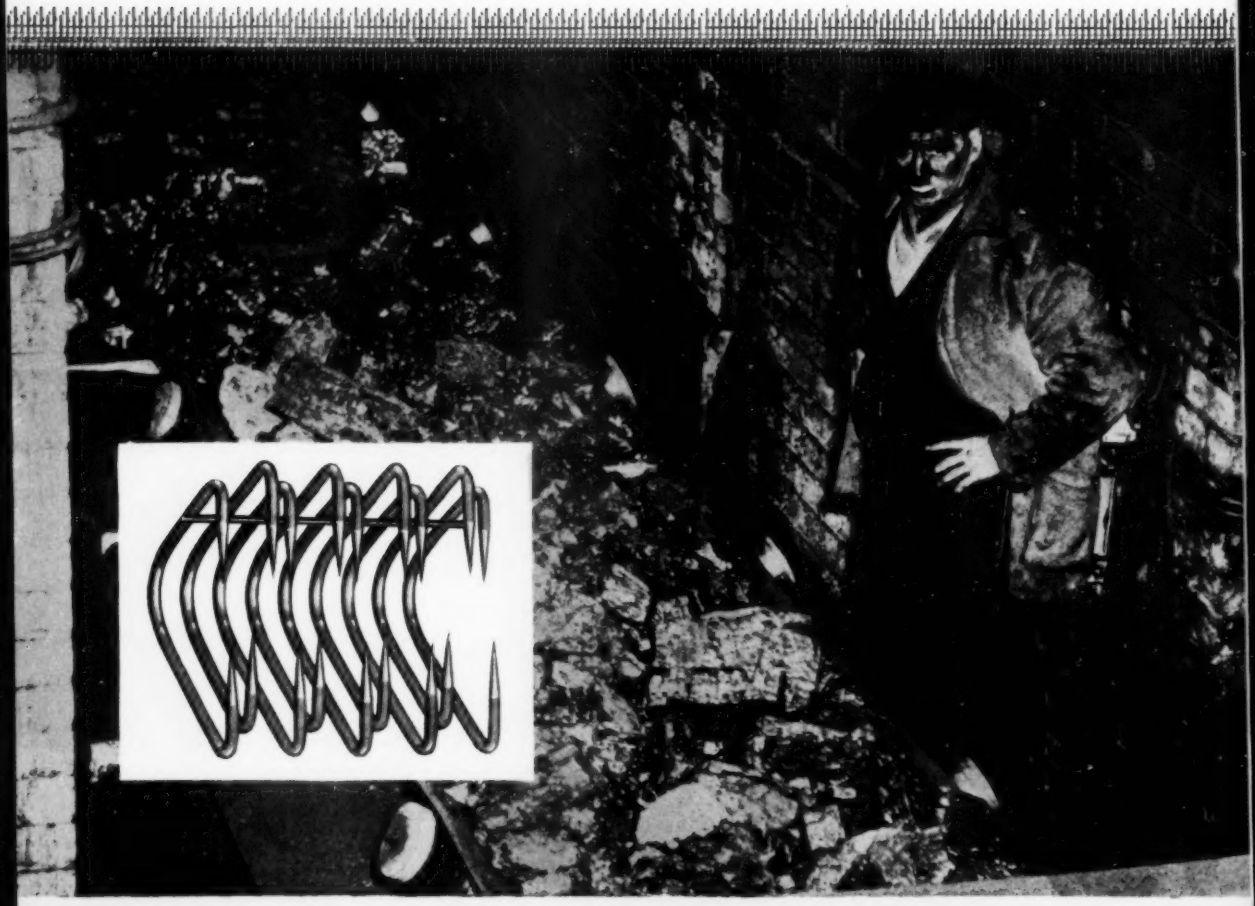

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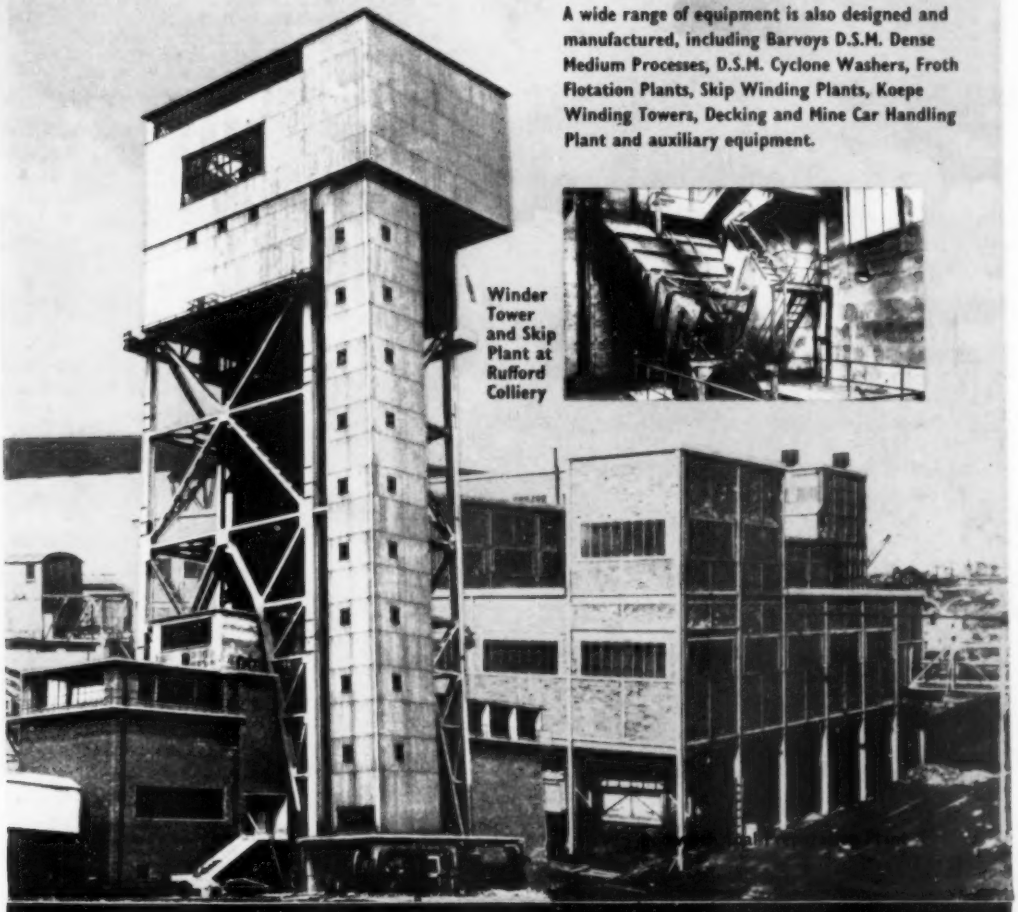

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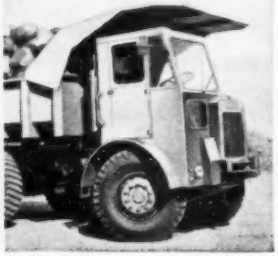

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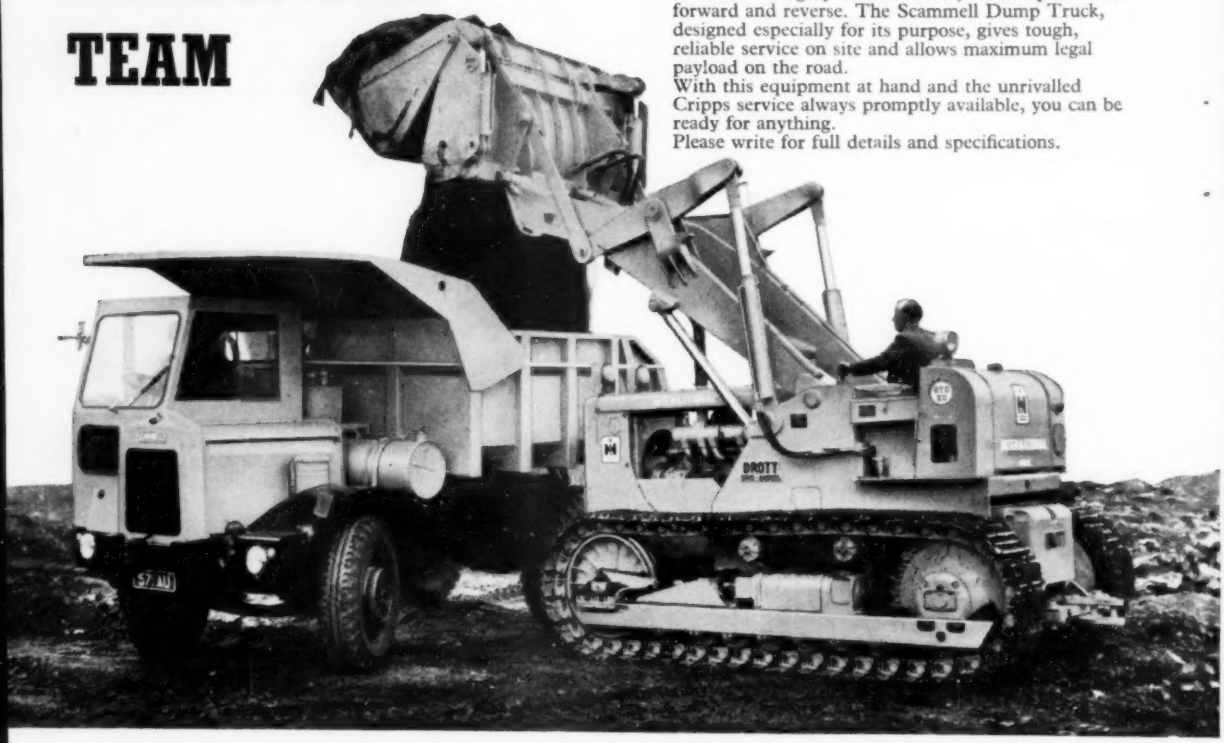

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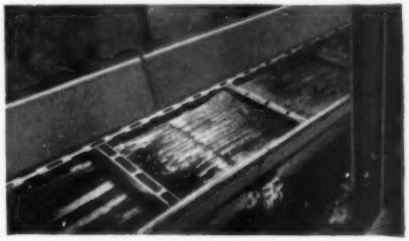

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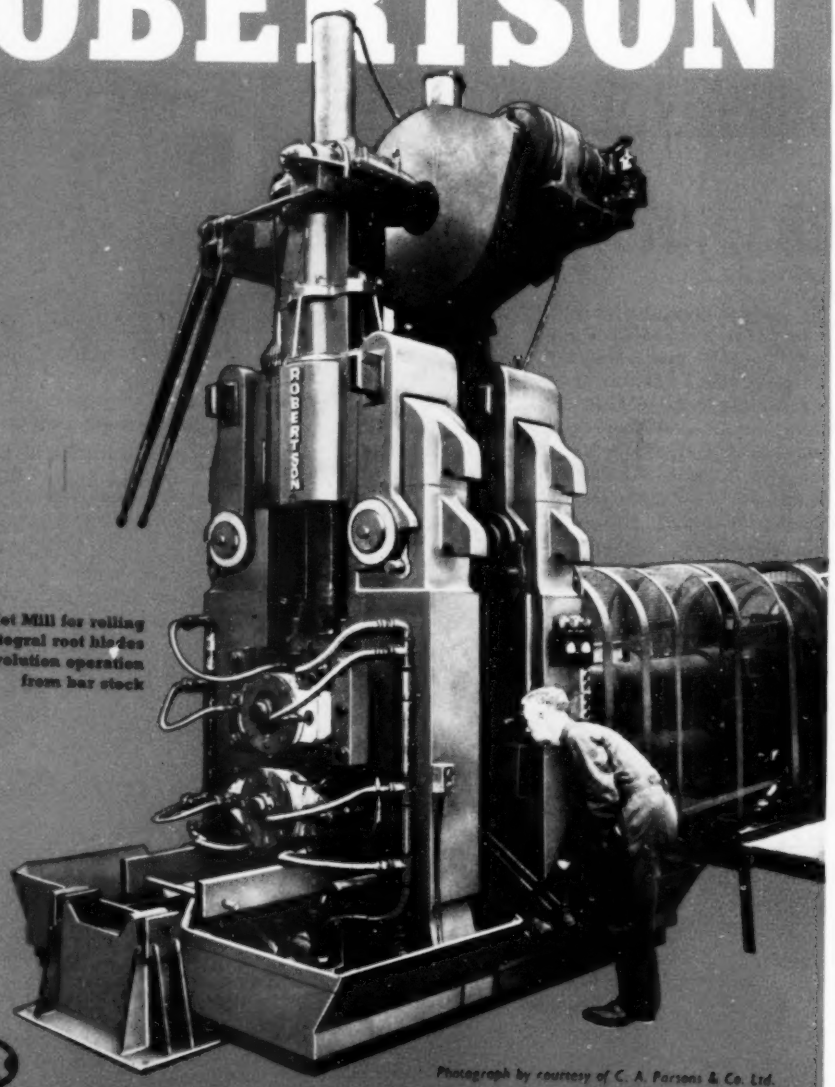

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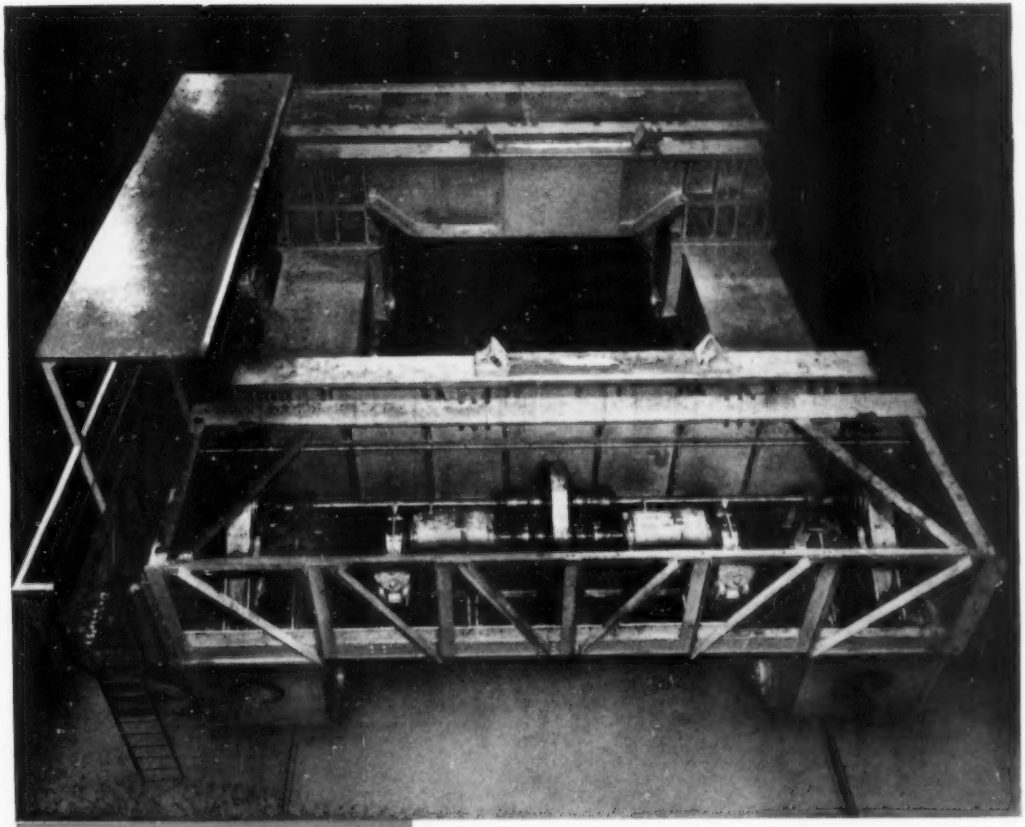

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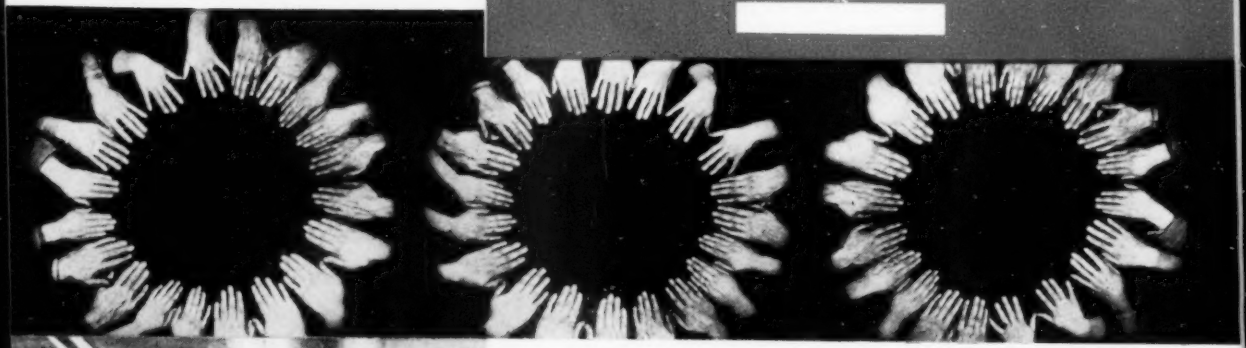

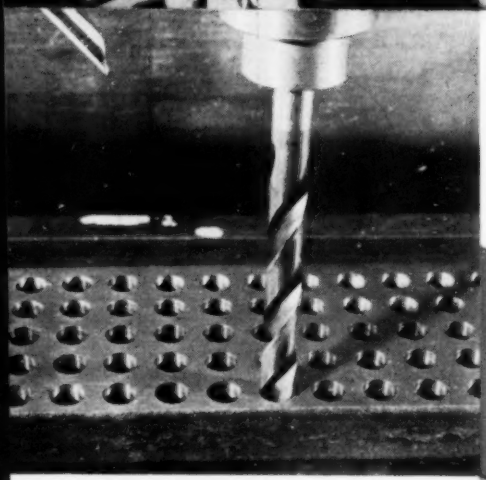

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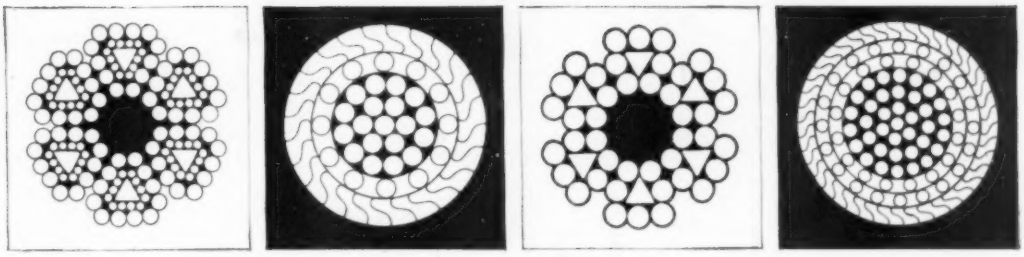

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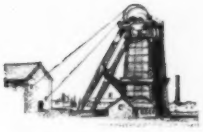

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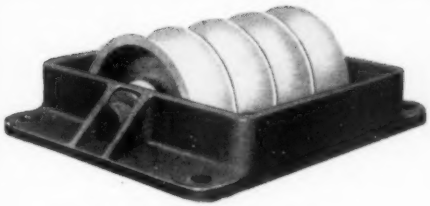
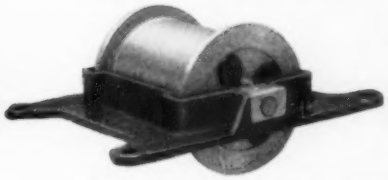


'CY' Multiple Rollers mounted in Malleable Iron Frame



'CY' Rollers to NCB Spec. P110/1954 mounted in Malleable Iron Frame with renewable 'Wynite' bearings. 14 ranges of sizes available, also supplied with Ball or Oilite bearings.

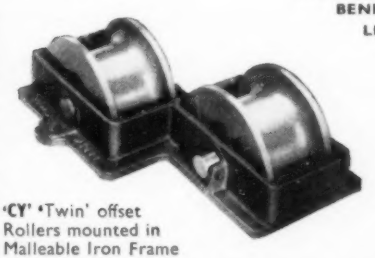
CY REGD

'CY' Haulage Surge Wheel Segments

abrasion-resisting alloy outlasts chilled iron by 3-5 times

other applications include **STOWAGE & WASHERY, PIPE BENDS & INSERTS & LINER PLATES**

'CY' Brake Blocks for Shunting or underground Loco's



'CY' 'Twin' offset Rollers mounted in Malleable Iron Frame

'CY' Angle Rollers mounted in Malleable Iron Frame

FOLLSAIN-WYCLIFFE FOUNDRIES LIMITED

Lutterworth nr Rugby **Tel: Lutterworth 10, 60, & 152**

Hunslet TRACTORS

The ST. 125 Surface Tractor

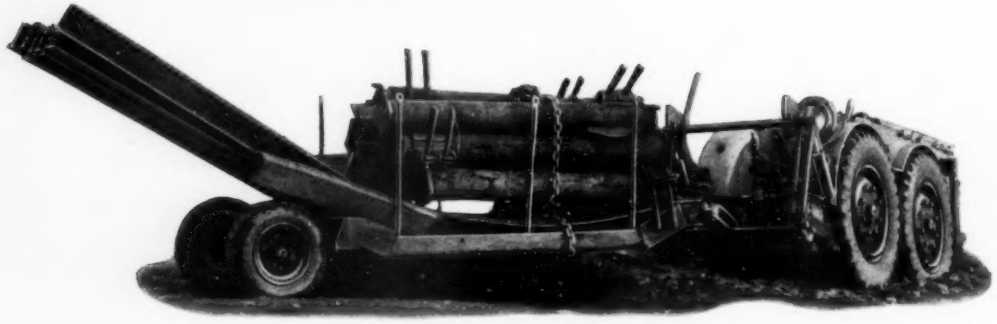
THE MT.25 *Flameproof* MINES TRACTOR

The MT.25 Flameproof Mines Tractor is robust, self-contained, and does not require rails or a specially prepared roadway. It can operate in areas where high coal dust and methane contents in the atmosphere may be encountered. The basic unit is equipped with a hydraulic pump and the frame is drilled for the attachment of ancillary equipment, for example:— Angle Dozer, Shovel Loader, Fork Lift, Winch, Trailers, etc.

BRIEF SPECIFICATION

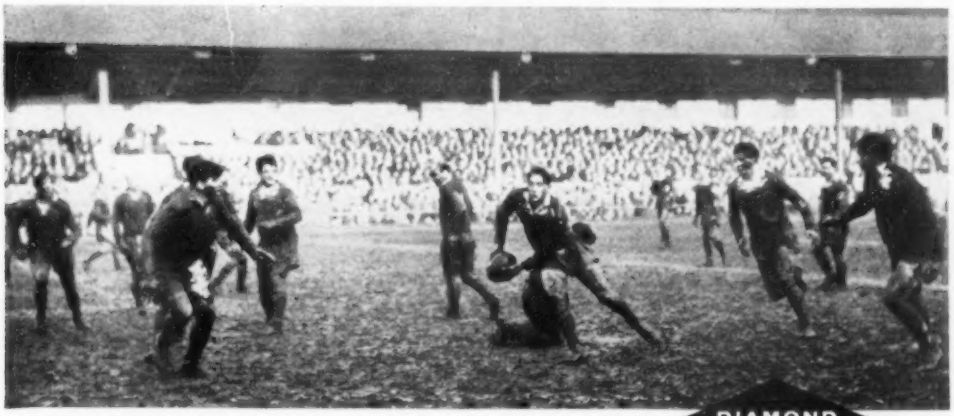
ENGINE:	3-cylinder watercooled flameproof diesel developing 25 h.p. nett at 1650 r.p.m.
TRANSMISSION:	By torque converter to epicyclic forward and reverse gearbox.
STEERING:	Slew-type giving a turning radius of 5′ 6″.
BRAKES:	Hand operated on all four wheels.
TYRES:	Large diameter heavy duty with total load capacity of 12 tons.
DIMENSIONS:	Width 3′ 0″, Length 8′ 11½″, Height 3′ 5″.

THE HUNSLET ENGINE CO. LTD.
LEEDS 10
LONDON OFFICE: LOCOMOTIVE HOUSE, BUCKINGHAM GATE, S.W.1.



H.85

where **wet** conditions are a hazard



Photograph by courtesy of Hull Daily Mail

DIAMOND TYPE

Fenaplast

COLLIERY CONVEYOR BELTING

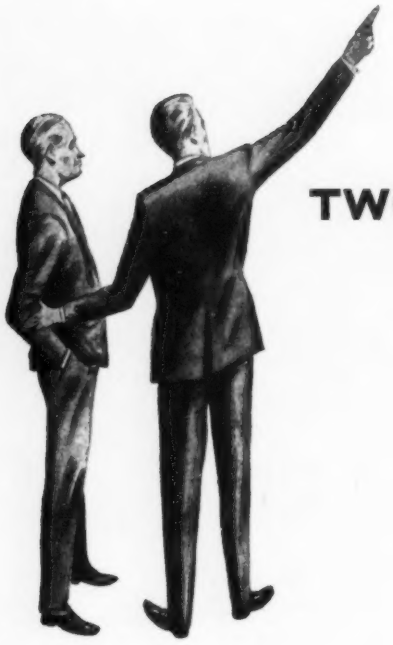
is the answer!

Like international forward John Whiteley,
Fenner Diamond type belting is a top-class performer under all conditions.
Why? Because the handling ability of Diamond belting is backed by a cover defence that withstands even the injurious attack of mine water.
The all-round strength of this new range of colliery conveyor belting eliminates breakdowns in vital movements—
puts an end to the penalty of production losses.
It is proving a winner in all tests . . . especially where wet conditions are a hazard.

RANGE OF DIAMOND TYPE BELTINGS AVAILABLE					
N.C.B. APPROVAL NO.	150	158	149	158 HD	149 HD
TYPE	LIGHT DIAMOND	STANDARD DIAMOND	DOUBLE DIAMOND	HEAVY DIAMOND	EXTRA HEAVY DIAMOND
BREAKING LOAD MINIMUM PER INCH WIDTH	2000 LB	2000 LB	2500 LB	3000 LB	4000 LB
THICKNESS	7½ mm	8 mm	8 mm	8 mm	9 mm

J. H. FENNER & CO. LTD. HULL

LARGEST MAKERS OF V-BELT DRIVES IN THE COMMONWEALTH



TWO HEADS ARE BETTER THAN ONE!

How Wharton service backed by years of experience can help you.

From the moment of conception in planning craneage for a new plant, works, or the installation of a replacement crane the Wharton technical representative can be of invaluable service.

By carefully studying the problem with the customer, Wharton can incorporate his needs; at the same time using their experience to ensure equipment supplied gives complete satisfaction.

Whether your needs concern a 200-ton overhead electric crane or a light electric hoist it will pay you to call in Wharton. We have a head for cranes and lifting problems—and you can use it!

This Catalogue describing Cranes and Hoists may be of help—if so write for it today.

THE WHARTON CRANE & HOIST CO. LTD.

REDDISH - STOCKPORT - ENGLAND

Phone : Heaton Moor 2227. Grams : "Gallant, Manchester." Code : Western Union.

LONDON: Lincoln House, 296-302 High Holborn, W.C.1. Phone: Chancery 7911. Grams: Chancery 7911.
SCOTLAND and NORTHERN COUNTIES: Gordon Baxter & Co. Ltd., 25 Blythswood Square, Glasgow, C.2. Phone: Central 6917-8. Grams: Gorbaxco, Glasgow.
MIDLANDS: A. R. Holland & Son, 89 Cornwall Street, Birmingham 3. Phone: Central 1457. Grams: Central 1457, Birmingham.
SOUTH-WEST: R. C. Collins, 48 Westbourne Road, Penarth, Glamorgan. Phone: Penarth 58527. Grams: Penarth 58527.
NORTHERN IRELAND: General Engineering Products Ltd., 7-9 Great Patrick Street, Belfast. Phone: Belfast 23743. Grams: Belfast 23743.
REPUBLIC of IRELAND: Charles Nolan & Co., 2 Parker Hill, Lower Rathmines Road, Dublin. Phone: Dublin 93510. Grams: Dublin 93510.
CANADA: Marshall Equipment Co. Inc., P.O. Box 28, 61 O'Connell Avenue, Dorval Station, P.Q. Phone: Melrose 1-3528. Grams: Marquipco, Montreal.
Gordon Russell Ltd., 1161 West Fifth Avenue, Vancouver 9, B.C. Grams: Rustle.
Mumford, Medland Ltd., 576 Wall Street, Winnipeg, Manitoba. Phone: 37-180, 37-187-188-189. Grams: Mandem.
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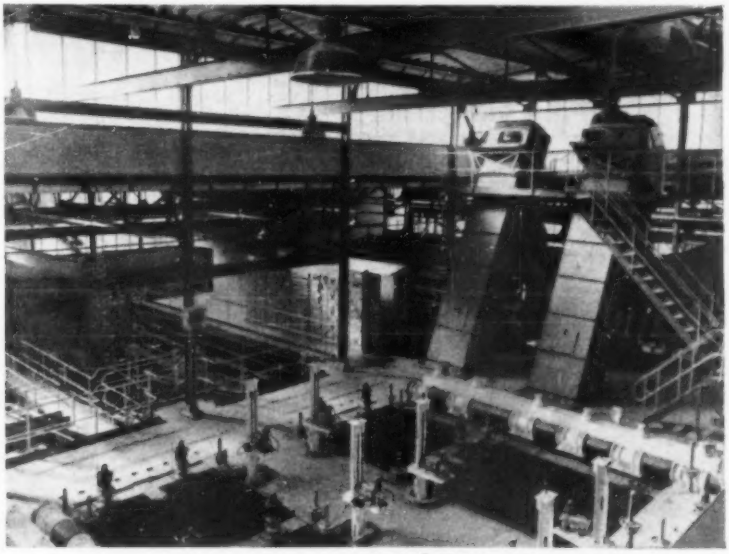
REPRESENTED IN FRINCIPAL COUNTRIES THROUGHOUT THE WORLD

The top floor of the new 500 t.p.h. Baum plant built for the National Coal Board at Killoch Colliery. Photograph by kind permission of National Coal Board.



COAL PREPARATION STARTS WITH

SCIENCE

Taking a sample of the dense medium in the Simon-Carves dense medium pilot plant.

The success of the current modernisation policy demands that installations serving the new high-output mine shall be of the highest technical, mechanical and structural quality. This is particularly true of the coal preparation plant, for breakdown or inefficiency there cannot be tolerated if outputs are to be maintained. In the Simon-Carves research and development plant, a large staff of scientists and engineers is constantly proving new developments in coal preparation technique. Only facilities such as these, backed by fifty years' experience of the business, can provide the vital mastery of the art of coal preparation so necessary to modern mining economy. Facilities like these mean plants like this.

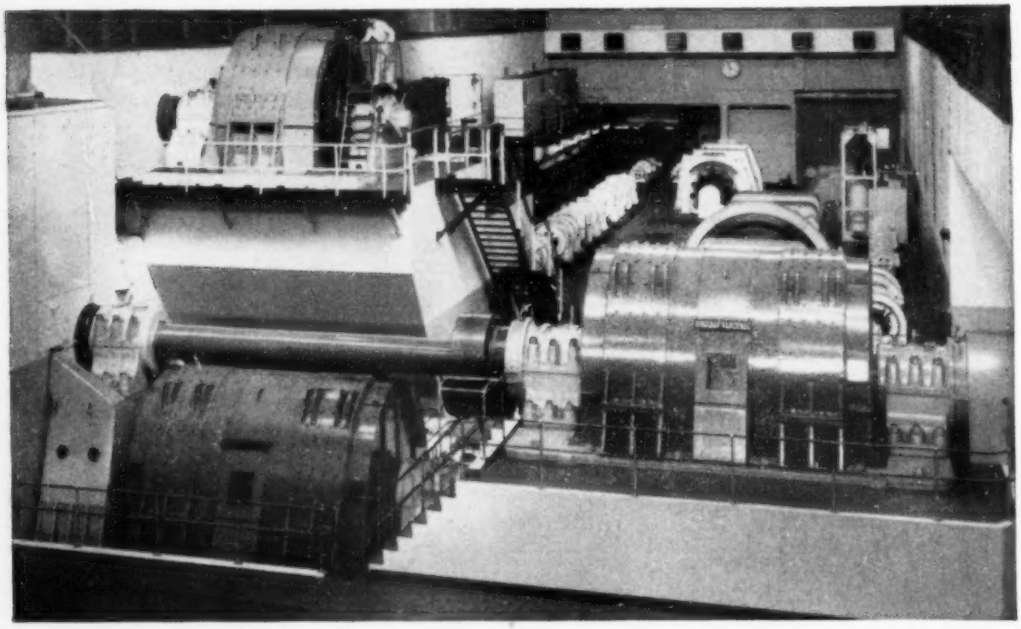
COMPLETE COAL PREPARATION PLANTS BY

Simon-Carves Ltd

STOCKPORT, ENGLAND

and at CALCUTTA · JOHANNESBURG · SYDNEY · TORONTO

SC 233



Motor room of the universal slabbing mill, The Steel Company of Wales.

FIRST AGAIN

Still using the original 'ENGLISH ELECTRIC' twin-drive motors installed over ten years ago, Britain's first twin-drive, hot reversing, 45-inch slabbing mill at the Abbey Works of The Steel Company of Wales was transformed into Britain's first universal slabbing mill.

A new mill stand having additional edger rolls driven by a 4,000 h.p., r.m.s. 'ENGLISH ELECTRIC' motor was installed. This brought the total output of the main drive motors to 13,000 h.p., r.m.s. with a maximum cut-out of three times full load torque.

The change-over to 'universal' was completed with only twelve days' loss of production.

'ENGLISH ELECTRIC'

steelworks equipment

THE ENGLISH ELECTRIC COMPANY LIMITED, ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2

Metal Industries Division, Stafford.

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

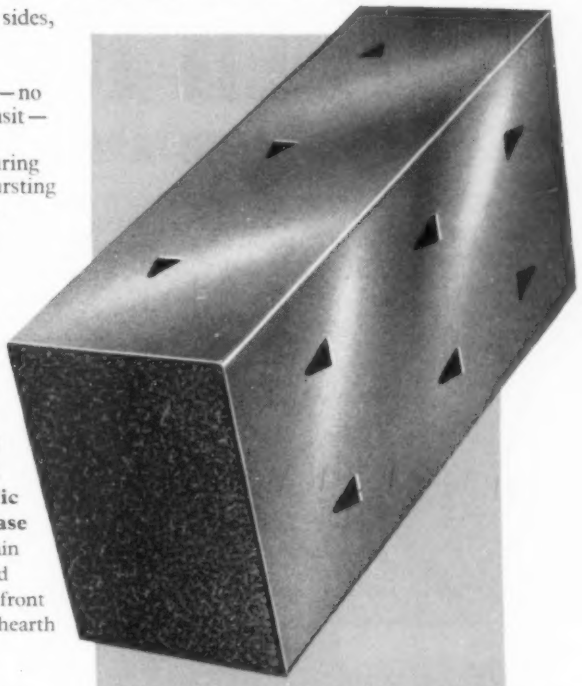
MT.59

G. R. FERROCLAD (Metal-Cased) BRICKS

-meet the demands of MODERN STEEL MAKING PROCESSES

Ferroclad bricks are steel-clad on four sides, and have the following advantages over the traditional fired bricks:—

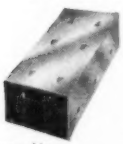
Absolute accuracy of shape and size—no loose plates—no damage during transit—easy to install—no jointing cement required—elimination of spalling during temperature changes—iron-oxide bursting reduced to a minimum—longer life.



COVERED BY BRITISH PATENT No. 546, 220

For over 10 years General Refractories Ltd. have manufactured steel-clad basic bricks under licence by the Heuer processes. **One of the principal features of Ferroclad is that the graded refractory material and metal casing form an integral unit by means of controlled hydraulic pressure—no air infiltration—the case fits like a glove.** It is made in four main qualities to suit requirements. Ferroclad bricks are extensively used in the roof, front and back walls, and ends of basic open hearth furnaces; in basic electric furnaces; and in copper reverberatory furnaces.

FERROCLAD 'EE' BRICKS



Divided internally by two plates placed lengthwise. This system reduces flaking and spalling to a minimum and can be applied to all Ferroclad shapes and sizes.

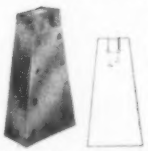
Covered by BRITISH PATENT Nos. 546, 220., 778, 047., and 778, 048

TABHANGER SUSPENSION

Bricks supplied with a special stainless steel tab co-moulded with the brick, embedded into the surface of the top face. By the use of a special tool the tab may be bent out at right angles to the top face to form a hanger.

Covered by BRITISH PATENT Nos. 546, 220 and 749, 491

FERROCLIP SUSPENSION



This method allows the brick to be suspended from the end. The Ferroclip hanger slot may be moulded into any roof or wall shape.

Covered by BRITISH PATENT Nos. 546, 220 and 600, 630

Everything in Refractories from the Genefax Group

The basic process of metal-cased brick manufacture is covered by British Patent No. 546,220 and other additions, including the "Ferroclip", the "Tabhanger" and the "EE", are covered by British Patent Nos. 546,220, 600,630, 749,491, 778,047 and 778,048.

Full technical information on request.

GENERAL REFRACTORIES LTD

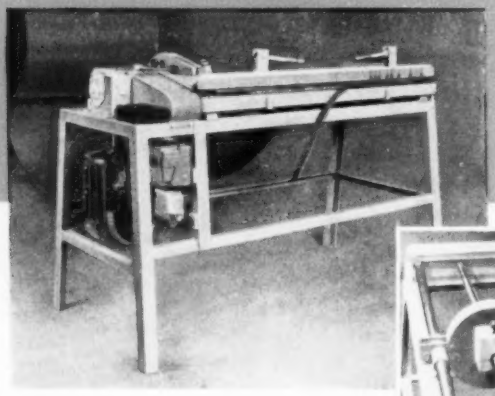
GENEFAX HOUSE · SHEFFIELD 10 · Telephone: SHEFFIELD 31113

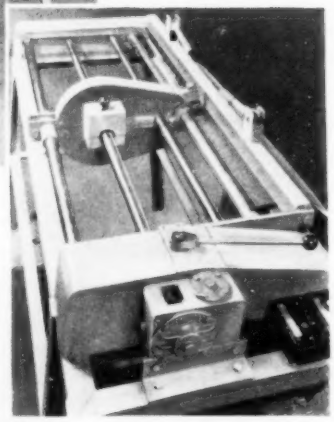
426

HAYDEN-NILOS

OFFER A COMPLETELY MECHANICAL

The machines illustrated provide a completely mechanical means of belt preparation for belt stores and large collieries, allowing exact lengths of belt ready jointed for use to be issued from the Stores. The obvious advantages include belt inspection, provision of exact lengths, and mechanical jointing of such lengths, giving a far higher degree of belt joint efficiency than is possible if this latter operation is carried out underground at the point of usage.





POWER DRIVEN CUTTING & JOINTING MACHINE

Power operated belt squaring and cutting attachment ensures a perfectly square belt, subsequent belt jointing is also carried out mechanically. All switches are interlocked to ensure correct sequence of operations. The jaw mechanism runs in an oil bath, and is designed so that it cannot overrun after the joint is completed.
Operated by a 2 h.p. motor; A 30in. WIDE BELT IS JOINTED IN SIXTY SECONDS.

HAYDEN-NILOS
PATENTED CONVEYOR BELT FASTENERS

HAYDEN-NILOS LTD · DARNALL ROAD · SHEFFIELD 9
Telephone: Sheffield 42001/4 (4 lines) Telegrams: "Hayden, Sheffield"

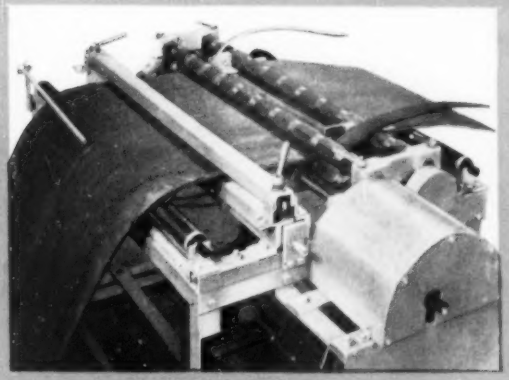
A COMPLETE EQUIPMENT
OR THREE SEPARATE MACHINES

1. CUTTING & BELT JOINTING MACHINE
2. BELT EDGE-TRIMMING MACHINE
3. BELT RE-ROLLING MACHINE

MEANS OF BELT PREPARATION

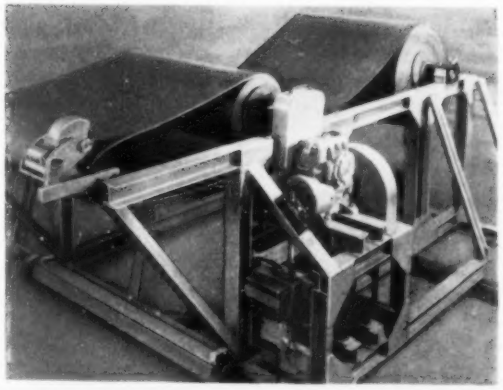
EDGE-TRIMMING MACHINE

Designed for trimming conveyor belts to a narrower width for re-use by removing damaged and worn edges. Power-driven rollers and vertical cutting blades are positioned to exact width of belt being recovered. Driven by a 1 h.p. motor; cutting speed 15 ft. per minute.



RE-ROLLING MACHINE

For re-rolling Conveyor belts after end jointing and for visual inspection. As the required length is taken from the roll a footage meter records the length, and the belt is lightly tensioned giving a tight, circular roll of minimum diameter. Driven by 2 h.p. motor; wrapping speed approx. 37 ft. per minute.



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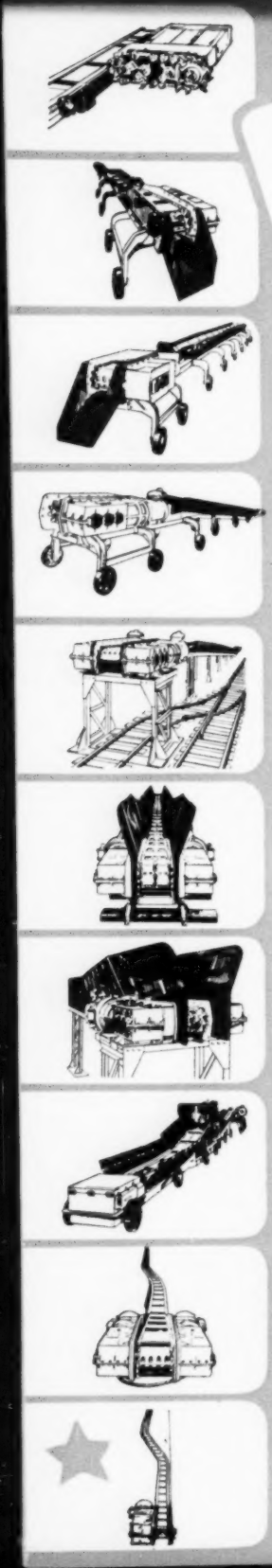
Telephone: Sheffield 42001/4 (4 lines) Telegrams: "Hayden, Sheffield"

HN 584



CRAWLEY

for

POWER LOADING

- **WILCOX CONTINUOUS MINER**
- **CRAWLEY MIDGET MINER**
- **MOBILE STAGE LOADER**
- **MOBILE STAGE FEEDER**
- **EXTENSIBLE STAGE LOADER**
- **EXTENSIBLE TUB LOADER**
- **MOBILE BUNKER CONVEYOR**
- **STATIONARY BUNKER CONVEYOR**
- **MOBILE AND EXTENSIBLE STAGE COAL BREAKER UNITS**
- **HEAVY DUTY ARMOURED SNAKING CONVEYOR**
- **C5 LO-HITE ARMOURED SNAKING CONVEYOR**

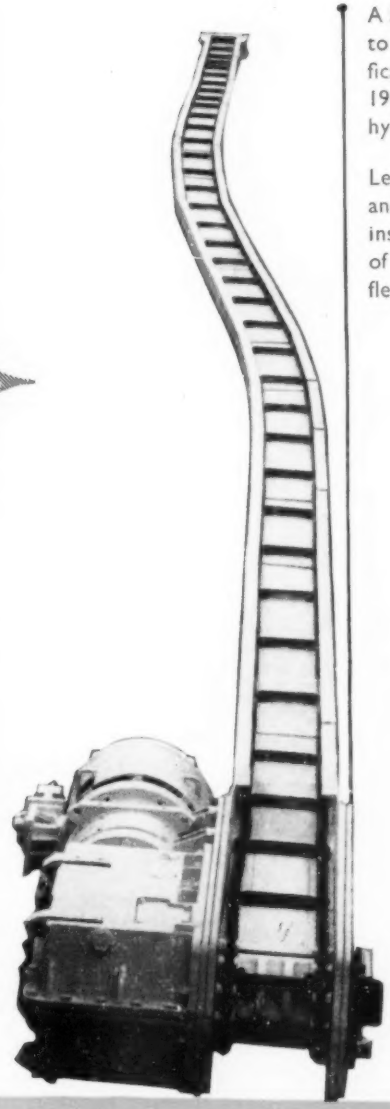
Crawley products are of high capacity, rugged in design and low in maintenance cost. They have a high degree of standardisation and interchangeability of parts, and offer an efficient and sure solution to the conveying and power loading problems common to the longwall system of mining throughout the world.

CRAWLEY INDUSTRIAL PRODUCTS LTD.
LLANELLY, CARMARTHENSHIRE. **Telephones and Telegrams: LLANELLY 4233**

A COMPANY OF THE AYLING INDUSTRIES GROUP

C5 LO-HITE ARMOURED SNAKING CONVEYOR

CAPACITY: 50-100 TONS/HOUR



A 5 inch conveyor of unit pan construction to National Coal Board mandatory specification. Overall height of drive head only 19½in. Can be fitted with Crawley integral hydraulic racking over mechanism.

Length up to 400 yards according to H.P. and gradient. Power rating to suit installation conditions. Optimum degree of snake, and a high degree of vertical flexibility.

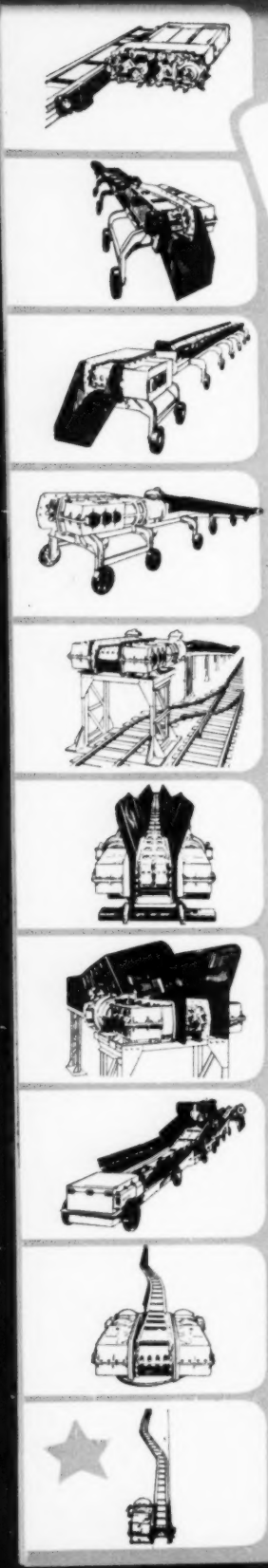
Chain speed from 114 to 185 feet per min. to suit individual conditions.

Alloy steel sprockets, giving long trouble-free service. Various types of spill plates available to suit operating conditions.

Crawley sectionalised pans for insertion at intervals in the conveyor run enable the pan line to be broken for inspection without breaking either top or bottom chain.

- **HIGH CAPACITY**
- **RUGGED CONSTRUCTION**
- **LOW MAINTENANCE**

Gear Box Assemblies are interchangeable in all Crawley Conveying Products.



CRAWLEY

for

POWER LOADING

- WILCOX CONTINUOUS MINER
- CRAWLEY MIDGET MINER
- MOBILE STAGE LOADER
- MOBILE STAGE FEEDER
- EXTENSIBLE STAGE LOADER
- EXTENSIBLE TUB LOADER
- MOBILE BUNKER CONVEYOR
- STATIONARY BUNKER CONVEYOR
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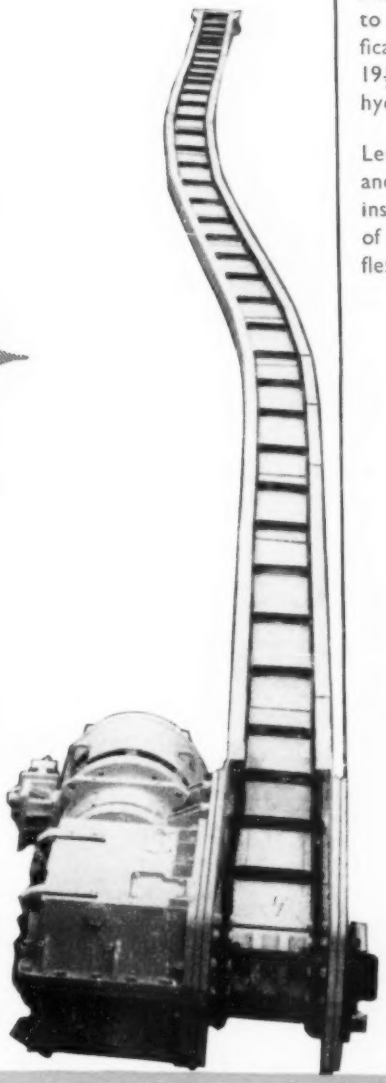

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- **LOW MAINTENANCE**

Gear Box Assemblies are interchangeable in all Crawley Conveying Products.

SOUND IN EVERY DETAIL

Supersonic testing of a steel base roll to check absolute soundness. Rigid inspection of this kind has built up our world-wide reputation for consistent, long-lasting accuracy—from the smallest work roll to the biggest back up.

THE BRITISH ROLLMAKERS CORPORATION LIMITED

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TEL.: COATBRIDGE 425.

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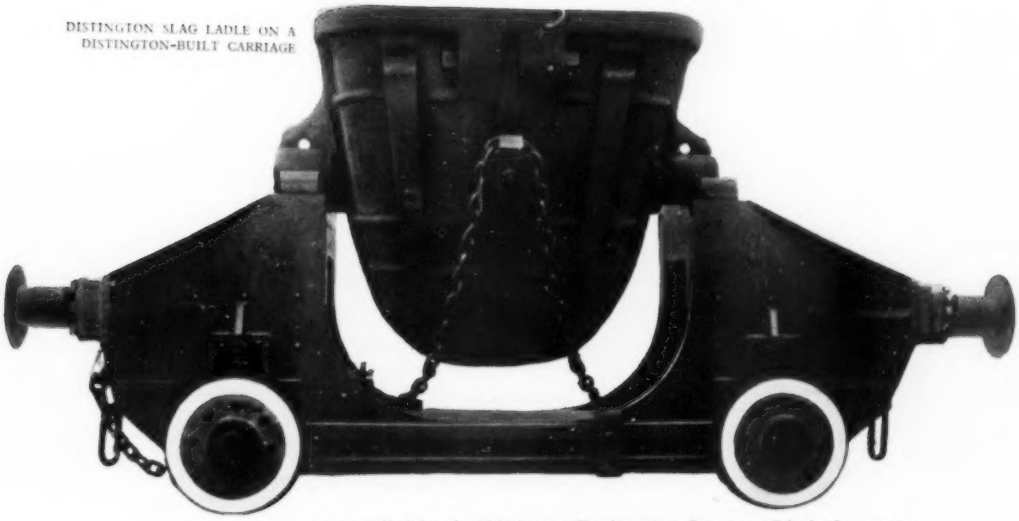
B.R.C. 36

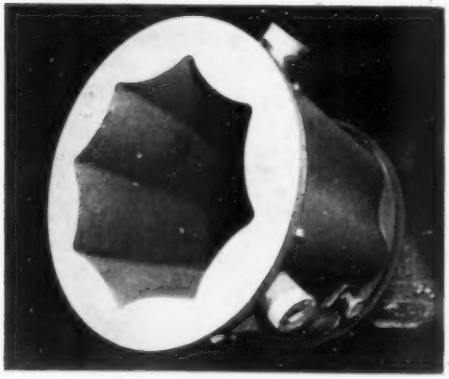
INGOT MOULDS SLAG LADLES STEELWORKS PLANT AND EQUIPMENT

DISTINGTON SLAG LADLE ON A DISTINGTON-BUILT CARRIAGE



are supplied by the Distington Engineering Company Limited to many steelworks. The Distington foundry has the highest output of any ingot mould foundry in Europe, and specialises in the production of ingot moulds and slag ladles. It can handle castings up to 120 tons in weight.

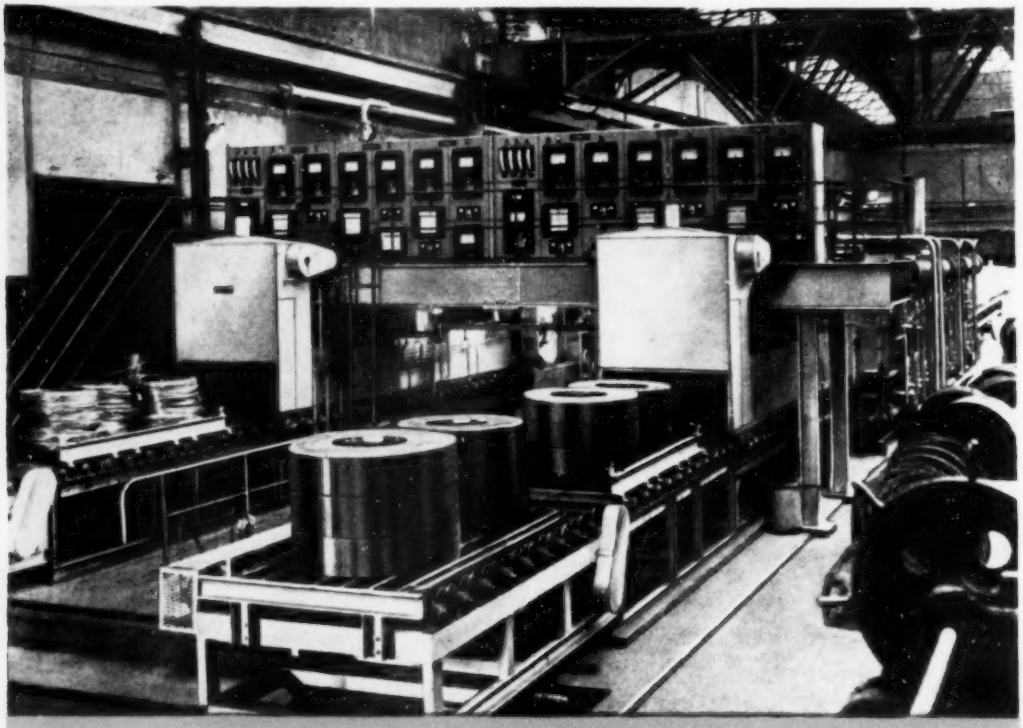
OCTAGONAL FORGING INGOT MOULD



DISTINGTON ENGINEERING COMPANY LIMITED
WORKINGTON, CUMBERLAND

A subsidiary of The United Steel Companies Limited

CA20



NASSHEUER

CONTINUOUS BRIGHT ANNEALING

FURNACES

(Patented)

- INCREASE PRODUCTION AND QUALITY
- LOWER MAINTENANCE AND OPERATING COSTS
- OUTPUT UP TO 5 TONS PER HOUR
- GAS OR ELECTRICALLY HEATED

SUITABLE FOR:—

STRIP IN COILS
WIRE COILS
BAR MATERIALS
SHEETS IN BATCHES OR SINGLY
TUBES · FERROUS OR NON-FERROUS MATERIAL

MANUFACTURED IN GT. BRITAIN BY THE SOLE LICENSEES:—

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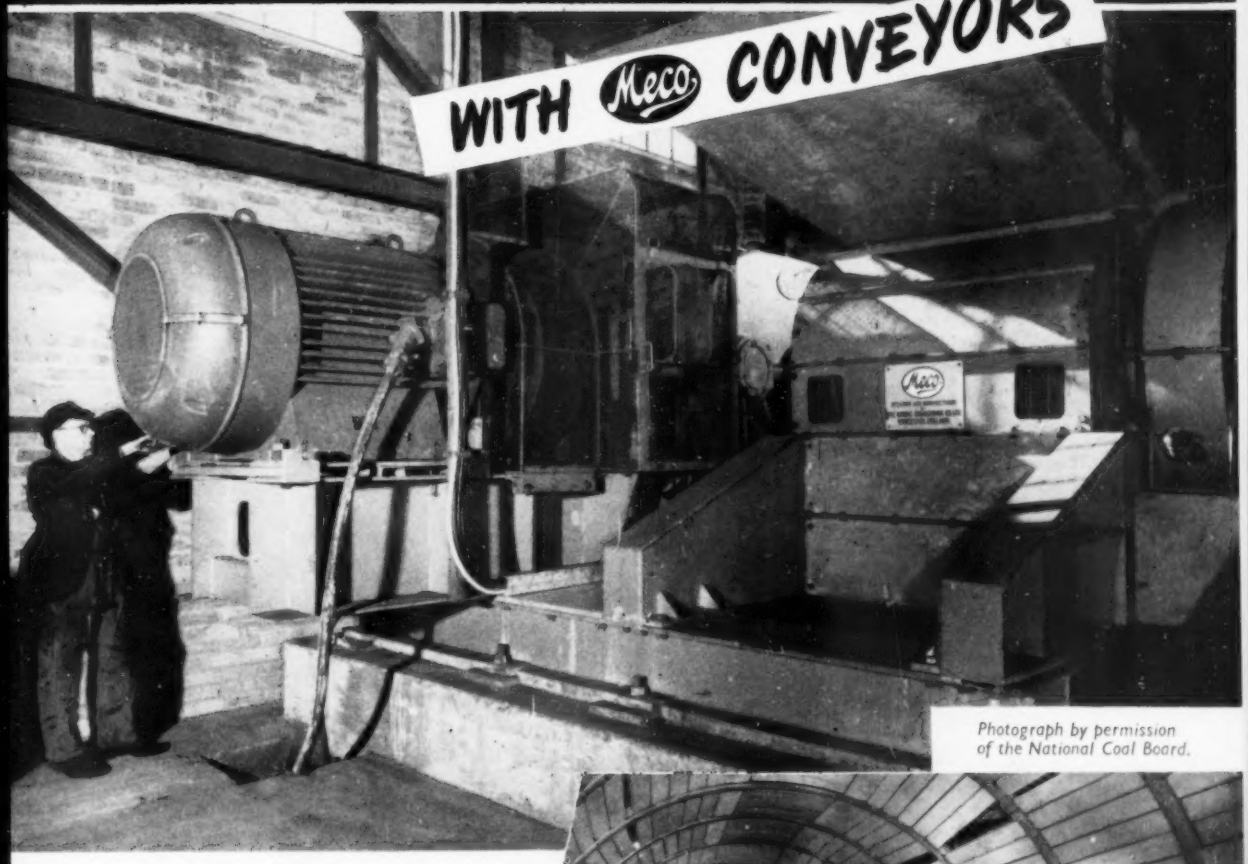
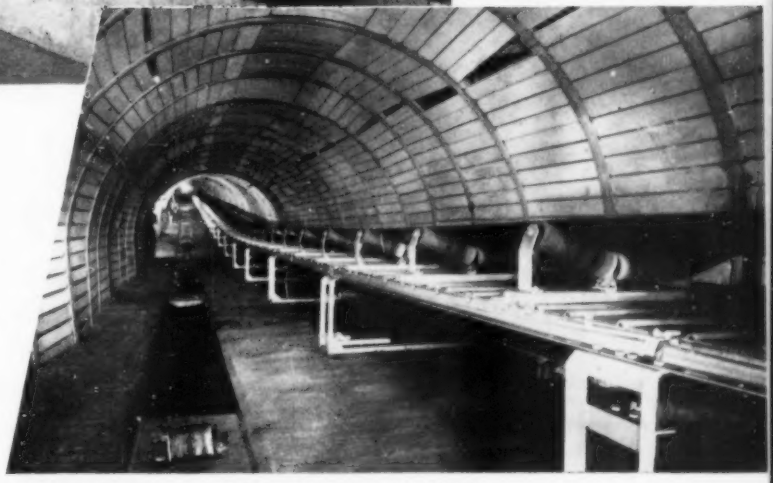
MAXIMUM ECONOMY IN DRIFT TRANSPORT

WITH Meco CONVEYORS



Photograph by permission of the National Coal Board.



The top illustration shows a Meco power pack rated at 45,000 ft. lbs. used as a single drive for a double drum belt conveyor driving head. The conveyor is 2,146 ft. long with a lift of 478 ft. and carries 2,000 tons day run-of-mine coal. The H.P. rating is 300 at 400 ft. min.

MECO STANDARD POWER PACKS, SINGLY OR IN COMBINATION, CAN BE BUILT UP TO THE MAXIMUM POWER OF ANY AVAILABLE HIGH DUTY CONVEYOR BELTING.

THE MINING ENGINEERING CO. LTD.,

MECO WORKS, WORCESTER, ENGLAND.

Telephone: Worcester 22291 (7 lines).
Telegrams: MECO Worcester.
London Office: 50 Pall Mall, London, S.W.1.
Telephone: Trafalgar 4686/7.
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L.P. 211—110

IT'S WORTH LOOKING INTO

When equipment for mine-traffic handling is required, it's worth looking into the Westinghouse range of products, which cover a wide variety of power-operated components, designed for the modern colliery.

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INSTALLATION

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SCANDURA GOLD LINE is the latest and finest of the SCANDURA family of fire-resistant conveyor belts.

Produced with all the experience of the company who originated P.V.C. fire-resistant belts, Gold Line has the additional outstanding advantages of nylon load-carrying fibres, a higher resistance to edge wear and an extraordinary operational toughness.

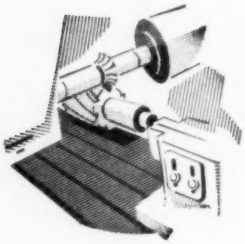
Belts branded SCANDURA GOLD LINE are the finest the industry produce.

SCANDURA

GOLD LINE

Scandura is the original P.V.C. conveyor belting and was the first to receive N.C.B Fire-proof Approval.

Manufactured by BRITISH BELTING & ASBESTOS LIMITED, CLECKHEATON, YORKSHIRE



On show at Leipzig—the talent and trade of the world. The work of fifty countries, including Great Britain—the best of their products for industry and agriculture—their newest advances in electronics, steel, machine tools, textile machinery, chemical plant, furniture, everything. So the Foreign Trade Organisation of the German Democratic Republic cordially invite you to

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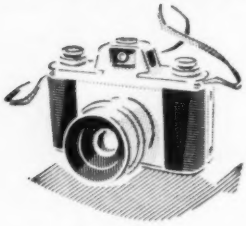

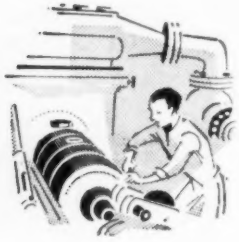

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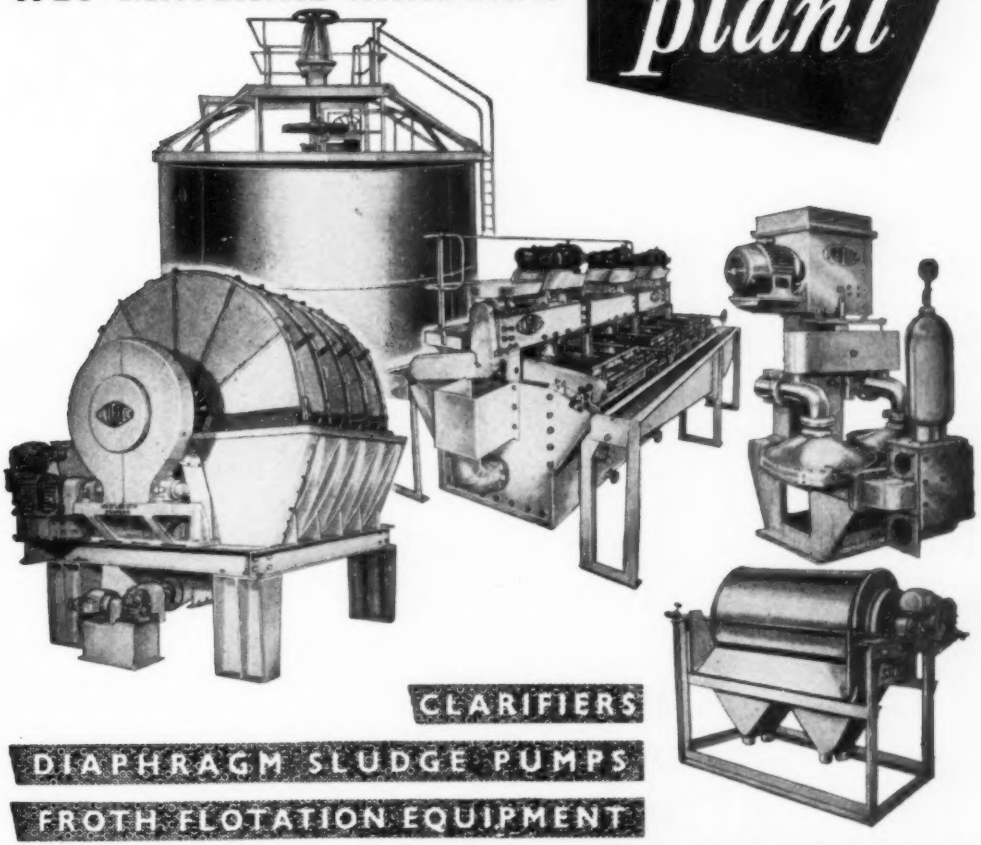

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HEAVY MEDIA SEPARATORS · WET MAGNETIC SEPARATORS

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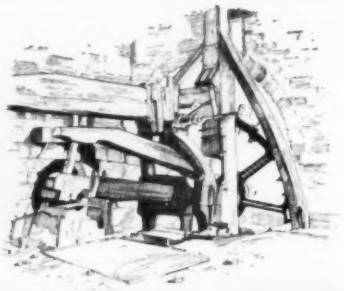
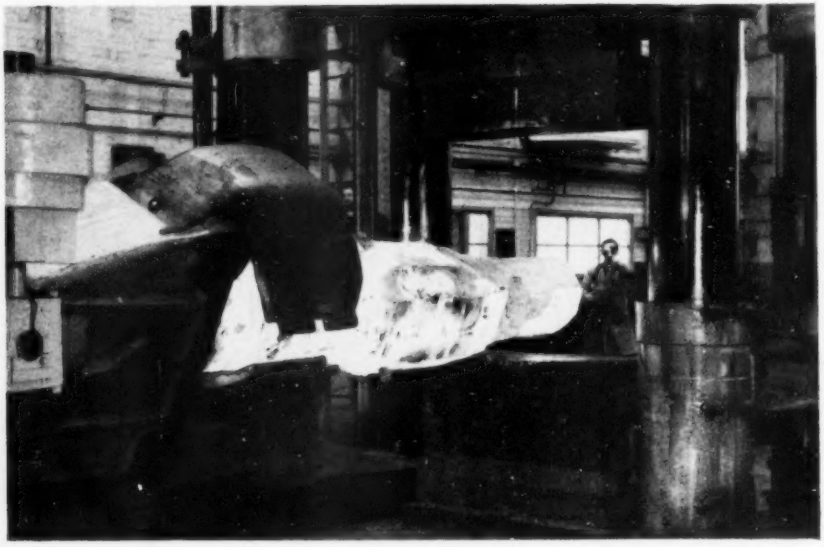
Steel in Both the Sixties





By 1860, Firth Brown, leaders even in those days, were far advanced in the techniques of forging quite large masses of steel.

Now—one hundred years later—Firth Brown are still acknowledged leaders in the making of the largest special forgings for Power Station Rotor Shafts, Forged Steel Rolls, and large units for Power transmission and Ships' propulsion.

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ALLOY STEELMAKERS · FORGEMASTERS · STEEL FOUNDERS · HEAVY ENGINEERS

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Sole Agents for the United Kingdom :

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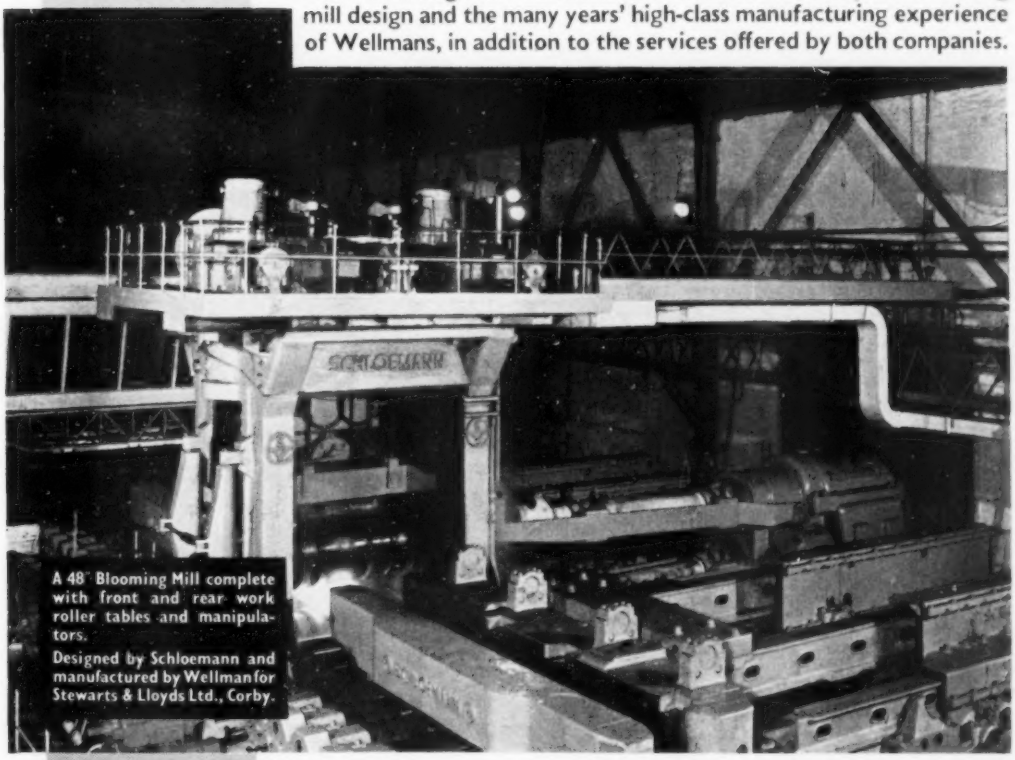
Schloemann AG., Düsseldorf, and The Wellman Smith Owen Engineering Corporation Ltd., London, have concluded an agreement, under the terms of which the two firms are to collaborate in the construction of hot and cold rolling mills, for ferrous and non-ferrous metals, in Britain and the Commonwealth countries. Steelworks in these territories will therefore be able to take advantage of Schloemann's advanced techniques in rolling mill design and the many years' high-class manufacturing experience of Wellmans, in addition to the services offered by both companies.



A 48" Blooming Mill complete with front and rear work roller tables and manipulators.
Designed by Schloemann and manufactured by Wellman for Stewarts & Lloyds Ltd., Corby.

WELLMAN

THE WELLMAN SMITH OWEN ENGINEERING CORPORATION LTD

PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1. WORKS: DARLASTON, South Staffs, & BELFAST.

What makes *this* diesel crane better than others...

FEATURES LIKE THESE!

FAST, CONTINUOUS OPERATION
Takes less time. Hoists 5-ton load *on single line* at high speed.

ABSOLUTE PRECISION LOAD-LOWERING
New power-lowering feature provides creeping speeds for accurate placing of loads.

NONE TO COMPARE FOR GRABBING DUTIES
Sound construction and equipment, including Smith's automatic double-barrel (operated by single control), gives incomparable grab service. For single line grab duties, normal barrel is used.

ADAPTABLE FOR MAGNET WORK
Many of the larger firms in iron and steel use this machine.

CARRIAGES TO SPECIFICATION
Supplied to suit standard British gauge or as required.

YOUR CHOICE OF POWER UNITS
Gardner 6LW, or other leading makes of equivalent horsepower, can be fitted if required.

TRIPLE-MOTION ACTION
Hoists, slews and derricks simultaneously, or slew and travel together.

POWER TAKE-OFF
Power transmitted through Vulcan-Sinclair fluid coupling.

A Smith diesel crane on grab duty at United Glass Ltd.

This is the Smith standard diesel crane which is ideally suited to solve the handling problems of so many industries—engineering, iron and steel, paper mills, public works, railways, coal and coke depots, waterways, etc. Let us have your enquiry—check on these features.

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Gas Fired Lime Kilns

FOR THE PRODUCTION OF LOW SULPHUR LIME FOR THE STEEL INDUSTRY

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Soaking Pits of all types.
Continuous Multi-zone Bloom and Slab Re-heating Furnaces.
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Forge and Heat Treatment Furnaces.
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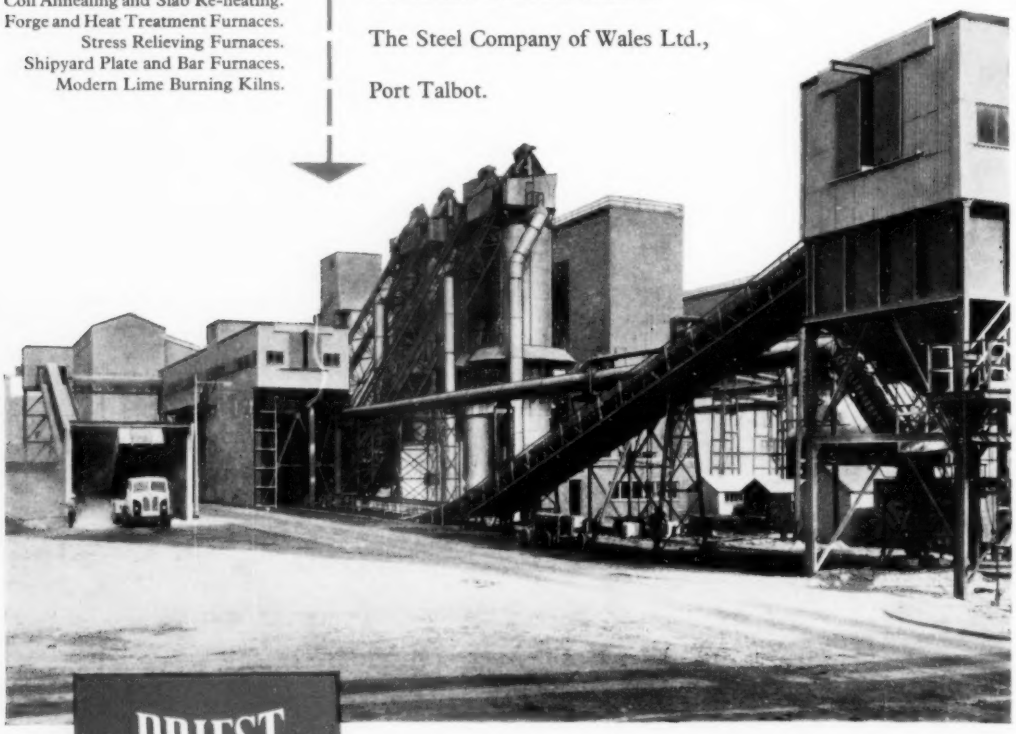
Shipyard Plate and Bar Furnaces.
Modern Lime Burning Kilns.

The Plant illustrated includes 4 Mixed Gas Fired Kilns complete with Limestone and Lime Handling Equipment. Each Kiln produces 75 tons of Lime per day for the new Bessemer Plant of The Steel Company of Wales Ltd., Port Talbot.



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Hydraulic operation

scores all along the line

Mine car handling equipment

- CONTROL POINTS
- TUB STOPS
- RETARDERS
- TUB PULLERS
- POWER PACKS
- RAIL POINT CYLINDERS

from one unit to a complete scheme

There are overwhelming advantages in Sutcliffe hydraulically-operated mine car traffic systems. They are self-lubricating and introduce substantial savings, not only in horsepower: up to 80% savings in manpower have been achieved in some cases!

Sutcliffe will plan and re-organise your present traffic arrangements or plan and provide completely new schemes to ensure the safest, simplest and most economical control. Single units are also supplied.

For further information and evidence of our experience in this field please write quoting ref: IR/143.

Sutcliffe

equipment takes good care of your coal

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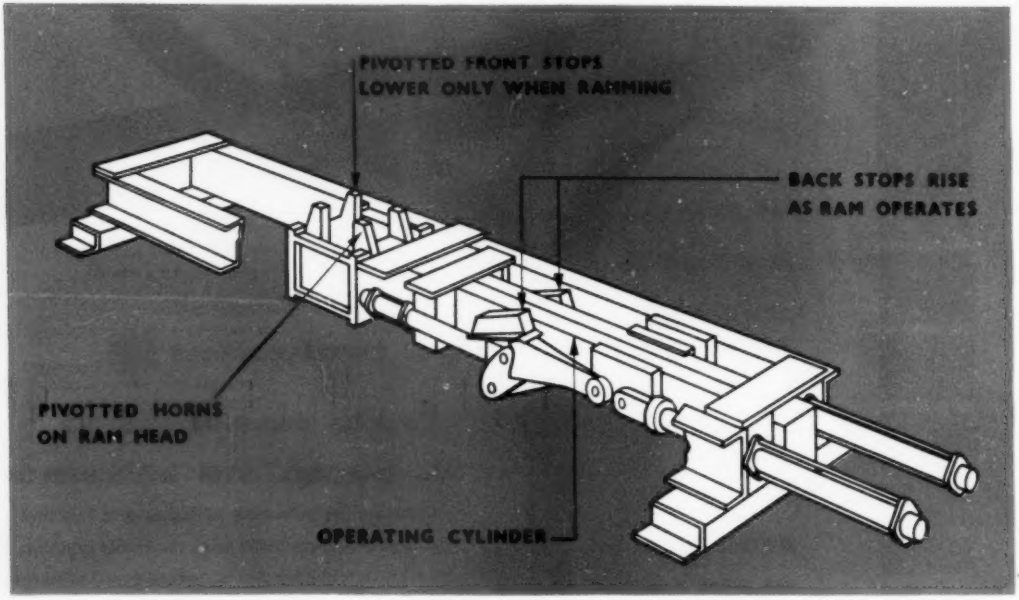
RENCO STOP PUSHERS HANDLE ALL CARS

PATENT NO. 851995



Cars handled safely and gently for Positive Stopping, Starting and Spacing

- Pneumatic operation
- Semi or fully automatic operation
- For feeding tipplers, traversers, weighbridges etc.
- Will place cars accurately and free on weighbridges
- Resilient front and back stops
- Easily installed with minimum excavation

These pushers prove their worth in operation by eliminating time losses from slow and sticking cars having high tractive resistance. Steep gradients are unnecessary where cars have to be stopped and later restarted—the cars are quickly pushed forward by the ram when required. The automatic resilient back stops rise to hold following cars until the ram returns, preventing over-running and allowing correct spacing and sequencing.

Send your enquiries to the mine car handling specialists:

RHYMNEY ENGINEERING COMPANY LIMITED

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A GAS PRODUCER PLANT IN 7½ MONTHS!

In November 1959 the National Coal Board asked us to build a complete gas producer installation at Manvers Main as quickly as we could. Site work started in December and in August 1960, only 7½ months later, the first producer was put on load.

The gas was urgently required for firing the ovens of the Manvers batteries so that rich gas, which had previously been used for this purpose, could be liberated for sale to the East Midlands Gas Board.

Thanks are due to the N.C.B. for their enthusiastic co-operation in this outstanding achievement.

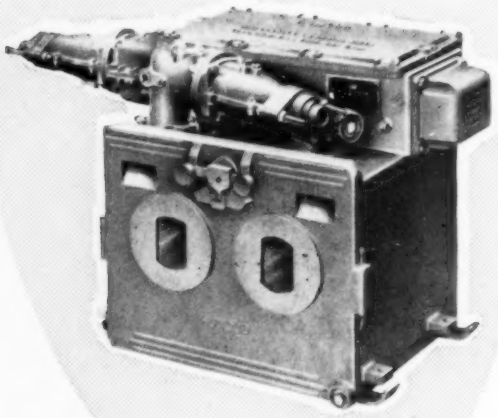
Photo by courtesy of N.C.B.

COMPLETE GAS PRODUCER PLANTS BY

Simon-Carves Ltd

CHEADLE HEATH · STOCKPORT

SC 243



General view of Huwood Recording panel with B.I.C.C. flit plugs.

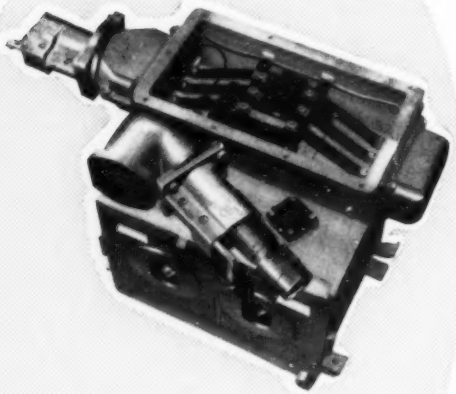
The HUWOOD FLAMEPROOF RECORDING PANEL Type HM12

The instruments most frequently supplied with the panel are a combination of ammeter, voltmeter and kilowatt meter controlled by a common drive and recording on separate charts, but the panel is suitable for power factor meter, frequency meter or integrating kilowatt hour meter.

FLP

A VERSATILE RECORDER

View of panel from above. Fitted with incoming and outgoing Huwood 100 amp. plugs and sockets. Provision for direct reading voltmeter (or ammeter).



Can be used with pliable armoured cable fittings such as the Huwood 100 & 30 amp. plugs—Groups I & II.
. . . with B.I.C.C. flit plugs—Group I, or with Huwood cable box—Groups I & II.

This flameproof recorder is available for many different recording instrument arrangements, is rated for up to 200 amps. 650 volts, and can be banked both with any gate-end box to N.C.B. specification and with most switchgear prior to this specification.

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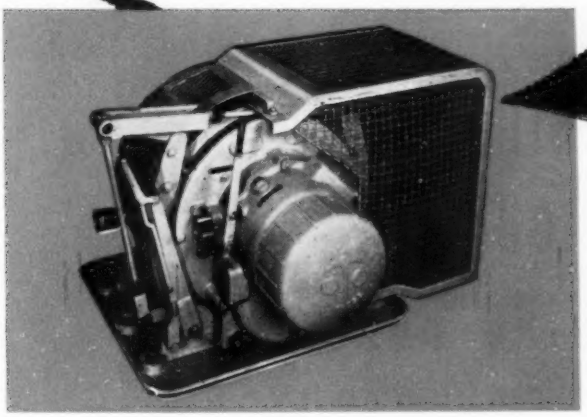
EE/FA/203

This PIKROSE FRONT SAFETY GUARD gives ADDED safety



PIKROSE

- **Designed primarily for the Mining Industry.**
- **Ideal for Endless Rope Work.**
- **Quickly and easily fitted.**

In addition to the standard rope guard always supplied with our Haulage Gears and Hoists, we are pleased to introduce the New 'PIKROSE' Front Safety Guard. This Guard, which is available as an optional extra, ensures that personnel working on or near the Haulage Gear are unable to reach any moving parts, including the rope drum, whilst the machine is in operation, so preventing accidental injury to hands or feet.

All the Haulage Controls, lubrication and chief maintenance points are clear of the guard, which therefore only needs to be removed under exceptional circumstances.

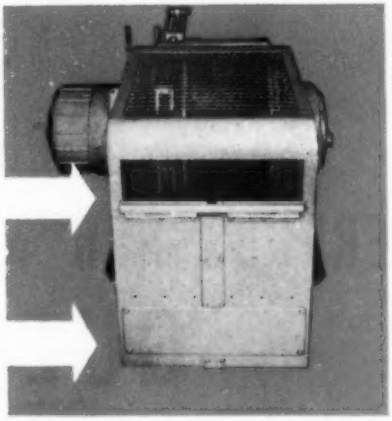
Guards of similar design and construction are available for all existing 'PIKROSE' Haulages of the types listed below.

Size 2 Single Speed, Electric and Compressed Air Single Drum.
Size 2 Two Speed, Electric and Compressed Air Single Drum.
Size 3 Single Speed, Electric and Compressed Air Single Drum.
Size 3 Two Speed, Electric and Compressed Air Single Drum.
Automatic Hydraulic Haulage Gears Sizes H1, H2 and H3.

The guard is shown fitted to a 'PIKROSE' Size 2 10 h.p. two speed, electric, single drum haulage. This model gives two separate rope pulls, operating at either normal speed, giving an average pull of 2,035 lb at 160 f.p.m. or alternatively a slow speed may be selected, which gives a very powerful average pull of 4,960 lb at 70 feet per minute.

'PIKROSE' F.L.P. electric hoists operate with alternating current at voltages for 200V—600V three phase. We also manufacture smaller and larger compressed air and electric hoists up to a lift of 16,200/20,000 lb and many different rope speeds and arrangements are available at the choice of the user.

Ask us for further information.



The front panels of the guard may be removed and located in an alternative position depending on whether the rope is overwound or underwound.

AUSTIN HOPKINSON & CO. LTD. *Mining Engineers*

DELTA WORKS · AUDENSHAW · LANCASHIRE · ENGLAND *and* PENYGROES, NORTH WALES

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BLOOMS BILLETS SLABS
COLLIERY ARCHES AND PROPS
ROOFING BARS
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LIGHT RAILS AND SLEEPERS
BASIC AND HEMATITE PIG IRON
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FOR STEEL

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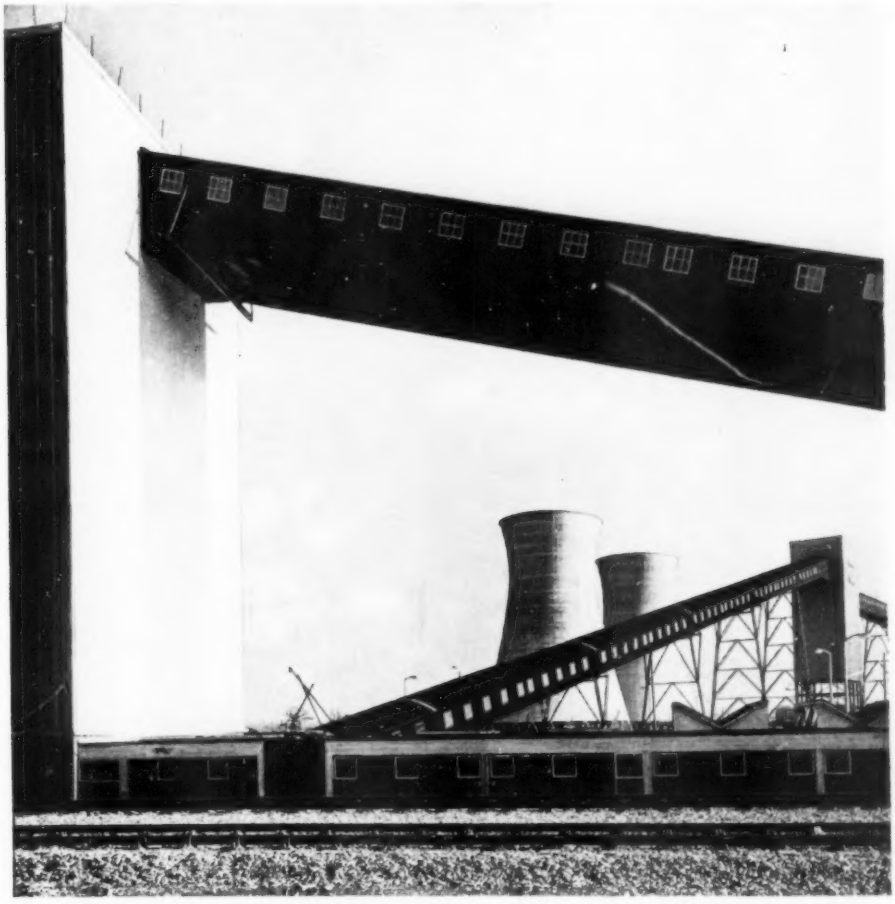
A MEMBER OF THE GKN GROUP OF COMPANIES



POWER STATION
COAL HANDLING PLANT by

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Manufacturers of all types of
MECHANICAL HANDLING EQUIPMENT
and complete BULK HANDLING INSTALLATIONS

NEW CONVEYOR COMPANY LIMITED

A COMPANY

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Holman Group News

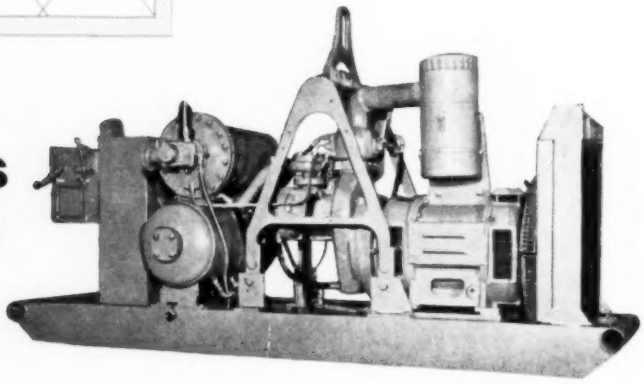
ANOTHER NEW HOLMAN PRODUCT

Quiet efficiency

and

low air cost

The Holman ROTAIR 600S Skid-Mounted Stationary Compressor



Silence and absence of vibration are important advantages of Holman ROTAIR electrically driven air compressors. Although ideally suited for permanent installation, the skid-mounted ROTAIR is particularly adaptable for temporary work.

The rotary-screw principle of compression employed, is distinguished by its efficiency and the minimised wear of the few moving parts. Positive clearances prevent metal-to-metal contact between the rotors and stator casing. The minimum of maintenance is required.

The ROTAIR 600S rotary-screw compressor delivers 600 cu. ft./min. (16.9 M^3) at 100 p.s.i. (7 kg/cm^2). Smaller stationary and portable models are available.

Write for catalogue R02/34.

Air... compressed air... **power**... **Holman**

HM44

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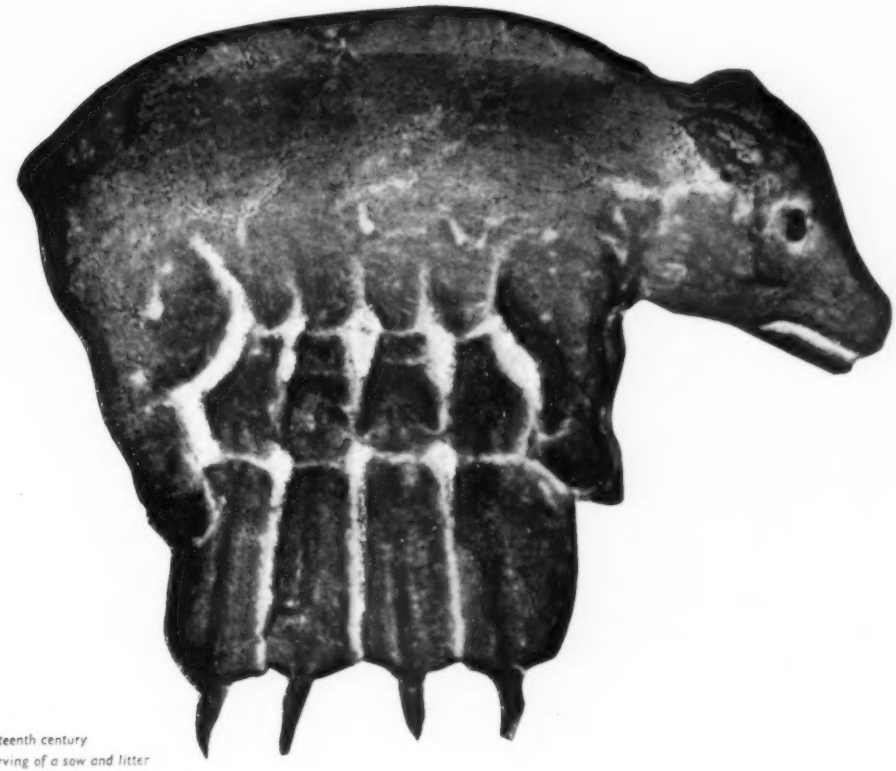


Fifteenth century carving of a sow and litter in Wrexham Parish Church. Photograph by Ruth Meyler & F. C. Sillar

50 MILLION PIGS GO TO MARKET!

In the early days of the industrial revolution manufacturers frequently looked for familiar and easily recognisable descriptions of their products. To the countryman transplanted into industrial surroundings nothing was more familiar than a pig; a fact which is emphasised by carvings in scores of old churches depicting pigs suckling their litter, rooting for acorns and playing the bagpipes. (Apparently this last pastime was forsworn by pigs many years ago because of unpleasant associations between bagpipes and pigs bladders.) Consequently, when iron from Blast Furnaces was directed into long troughs and from there into short and narrow troughs placed at right angles, a resemblance to sows suckling their appendaged litter led to the description of 'pig iron'.

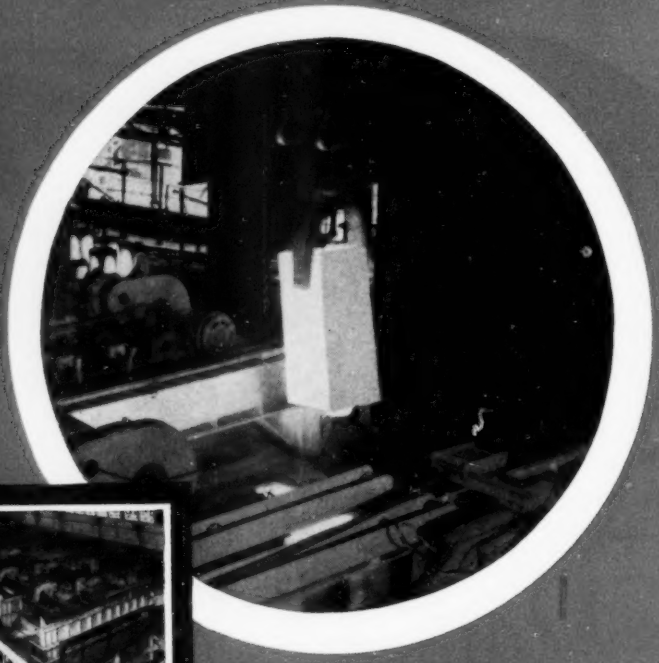
This series of advertisements illustrates some of the 'ecclesiastical' pigs and emphasises the 50,000,000 'special' pigs which Warner and Company have supplied to Iron Foundries producing High Duty Castings.

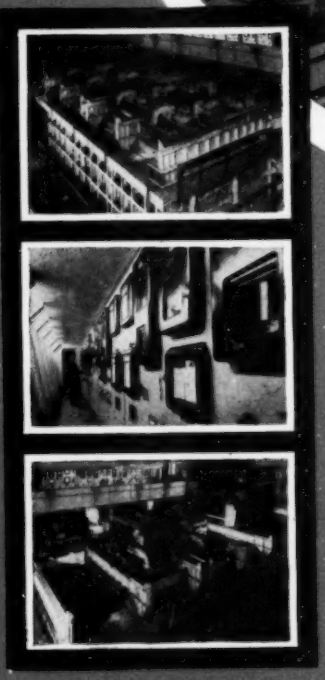
WARNER WARNER WARNER

"Pioneers of Refined Pigiron"

KA

WARNER & CO. LTD., MIDDLESBROUGH





4 Pits built
from start to finish
in 14 weeks

As part of the Workington Iron & Steel development plans we have recently commissioned a battery of four Surface One-Way Fired Soaking Pits.
These Pits were in operation fourteen weeks from the commencement of erection. We, together with our American and Continental associates have built over one thousand Surface One-Way Fired Pits in Steel Mills throughout the world.

Stein & Atkinson Ltd.

Westminster House Kew Road Richmond Surrey

FURNACE ENGINEERS

Broadway 5A/82

Vol. 182
No. 4829

IRON & COAL
THE IRON AND COAL TRADES' REVIEW

FEBRUARY 3
1961

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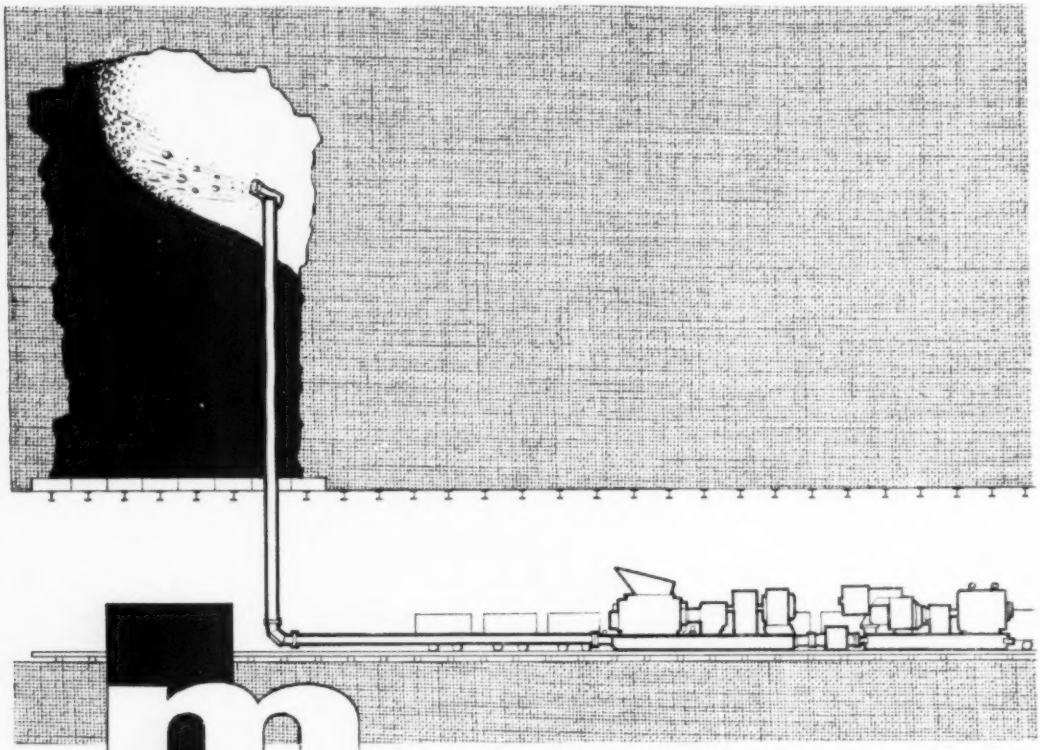

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IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 182 February 3, 1961 No. 4,829

Rating

NOBODY likes paying taxes, let alone local rates. Any increase in levies, whatever be the grounds for their imposition, is necessarily regarded as a burden on the people called on to pay them. Nevertheless, the people, having collectively ordained a Welfare State, must be collectively prepared to meet the bills as and when they come in. This is an inescapable conclusion.

There might be an argument for recasting the local rating system and consolidating it in the general tax structure. But this objective is distant. Meanwhile, the citizen is faced with at least two classifications of authority that are empowered by law to levy taxes.

At present, three distinct anomalies exist in the rating system: (1) Domestic property is 100 per cent. rated, but only on 1939 rental values, and as any review must take into account a sharp adjustment to meet contemporary values, it is bound to be painful unless a period of relief is provided. (2) Industry and freight transportation are rated at 50 per cent. of their 1956 rental values, and the question arises whether in contemporary society and under present conditions substantial relief should continue to be afforded to this classification of ratepayer. The Bill before Parliament thinks not. (3) Agricultural land and buildings have successfully evaded the rating structure.

The Rating and Valuation Bill, 1960, provides for the full re-rating of industry when the new lists come into force in three years' time, and it is argued by the Government that withdrawal of relief will not involve a doubling of the burden industry will be called upon to bear, as other categories, notably domestic premises, shops, and offices, will be called upon to pay at contemporary values. Householders, for instance, who bore 48 per cent. of the total rateable values in England and Wales in April, 1959, are to be assessed at current rates. To cushion the impact in this instance the Minister has reserved powers under Clause 2, enabling him to re-rate houses for the five-year period by a variable percentage to be fixed by Order in Council. Industry's case is that if special relief is to be accorded householders, relief should also be granted to industry, which faces the loss of substantial benefit.

Mr. C. R. Wheeler, president of the British Iron and Steel Federation, in his letter to The Times last week, maintains that partial industrial re-rating under the 1929 Act was not "a subsidy given in times of recession," but "a reform of the system of local taxation clearly desirable in principle." Whatever the underlying purpose of the 1929 Act, the Local Government Act, 1958, reversed this trend, and now the present Bill seeks to further this development. There is no escaping the fact that industry has been spared the major part of the burden for some 30 years, and now that change has been recommended it is bound to be unpopular. After all, local authorities are responsible *inter alia* for housing and education, and industry is interested in the success of both these services, particularly the expansion of the latter. Moreover, most of the additional services provided are readily used by local companies.

There are two factors that frequently escape attention. An upward revision of rateable values does not necessarily mean an upward adjustment of the rate levy. In fact, it should operate the other way, and lead to an abatement of the rate demand. This, Mr. Wheeler believes, is "an optimistic assumption" and, it must be admitted, any relief in the past has been all too little and all too short-lived. Industrialists could take greater interest in local affairs and not leave them to spendthrift legislators: a little commercial efficiency introduced into local government would be both stimulating and beneficial. The other point to be considered is that the extra rates demanded may be set off against income tax at the standard rate.

At the beginning of 1959 the Ritson report (report of the Committee on the Rating of Plant and Machinery) made its appearance, and shortly afterwards the Plant and Machinery (Rating) Order, 1960/122, made under Section 24 of the Rating and Valuation Act, 1925, was tabled, broadening the classifications of plant and machinery that were deemed to be part of an industrial hereditament. This was bound to cause anxiety for many manufacturers operating large industrial plants, and it is a pity that the Order and the Rating and Valuation Bill appeared within several months of one another. Looking at the schedule, among the many items included under Class 4 are "towers and columns for the absorption of gases or fumes, chemical reaction, cooling, oil refining and condensing, treatment and water"; under burners, "Bessemer converters, forges, furnaces, kilns, ovens and stoves." It is not difficult to determine the industries likely to be involved. Although the extent of the burden cannot be accurately evaluated, it must mean dearer products for the industries concerned. Unfortunately, the cumulative effect

of these provisions may be substantial, and, although, at the present time, a reliable indication of the added burden which will have to be carried cannot be given, it is not difficult to appreciate the very real concern that is already being felt—and expressed.

It is more difficult to amend existing legislation than to amend the provisions of a Bill before it becomes law. Constructive criticism of, and comment on the Rating and Valuation Bill now can serve a valuable purpose. It must not be ignored or dismissed as prejudiced. Industrialists are used to thinking ahead—years ahead—and as the future prosperity of the country and, therefore, of its local authorities, depends to a great extent upon the prosperity of industrial concerns, such criticism and comment merit careful consideration and adequate answer in the light of all the circumstances.

NEW OFFICERS OF THE INSTITUTE OF METALS

HEAD of the department of metallurgy at the University College of Swansea, University of Wales, Prof. H. O'Neill has been elected president of the Institute of Metals. The Earl of Verulam, who succeeded the late Earl as chairman of Enfield Rolling Mills, Limited, in November last, has been elected senior vice-president for the year 1961-62. Prof. O'Neill succeeds Sir Ronald Prain, chairman and president of the Rhodesian Selection Trust, Limited.

Deputy chairman and managing director of Telecon Metals, Limited, Mr. W. F. Randall has also been elected a vice-president. Mr. N. I. Bond-Williams, managing director of the Aston Chain & Hook Company, Limited, Prof. A. H. Cottrell, FRS, Goldsmiths' Professor of Metallury at Cambridge University, and Mr. G. A. Rider, deputy managing director of Birmid Industries, Limited, have been elected ordinary members of the council.

Retires After 40 Years with Dorman Long

MR. J. H. PATCHETT, has retired from the board of Dorman Long (Steel), Limited, the iron and steel manufacturing and ironstone mining member of the Dorman, Long & Company, Limited, group. Mr. George Foster, who is a special director, becomes general manager (production), and Mr. F. Kennedy and Mr. C. Moody, general works superintendents.

Mr. Patchett, who has spent a lifetime in the iron and steel industry where his wide metallurgical knowledge was recognized, first worked at the Lackenby ironworks, after early days studying blast-furnace practice. He joined Dorman Long at the Newport ironworks in 1919, becoming manager in 1926. After managerial appointments at most of the company's works, he became in 1952 a special director with managerial responsibilities covering all the iron and steel works, and four years later became an executive director and general works superintendent.

Mr. Patchett has served on a number of national and local committees, taking part for many years in negotiations on wages and conditions in industry. He is also a member of the Tees Conservancy Commission.

Passing Thoughts . . .

THERE are two fundamental things which affect everything we do, everything we make, everything we buy, everything we sell, and everything we export. These two fundamental things are the price of coal and the standard rate of income tax. . . . The price of coal is fixed by the State. It does not help export to put 10s. per ton on the price of coal. . . Parliament certainly must know how taxation affects us and how it affects our export trade and it must be obvious to Parliament that a reduction in taxation (most conveniently in the form of a reduction in the standard rate of income tax) would help us to meet the competition of other exporting countries and to sell more in export markets. —SIR WALTER BENTON JONES, chairman of the United Steel Companies, Limited.

> *Britain's tax system needs to be revised so that it does less to discourage earning, even if to balance this it has to do more to discourage spending.—The Economist.*

Factories with many independent units of machinery, working on batch systems, are now giving way to large integrated plants which are highly mechanized and work on continuous processes. These plants are necessarily costly, and since they are vital to the maintenance of our competitive position at home and oversea it is a matter of real concern to find that now, apparently solely by reason of their size, they are to be penalized through heavy rates. . . Indeed, it is hard to understand the logic of the Government's policy which seeks to encourage new investment and then taxes not only the profits arising from it, but even the investment itself.—MR. H. R. MATHYS, a director of Courtaulds, Limited, in a letter to The Times.

> *I have been reading and hearing a good deal . . . regarding "capital gains," but no one ever mentions "capital losses," of which I have had a few. Where there is a gain there is a loss, so really what is the good of such a tax unless you make refund also to the one who makes a loss?—Letter to the Birmingham Post.*

Some merchants say they have the stocks but cannot get the transport; others say they have the stocks and the transport but not the hauliers to deliver coal; some blame the influenza epidemic, or the weather, or both, while other merchants reserve their bitterest barbs for the miners, accusing them of all responsibility for the coal shortage because of the number of petty strikes. . . . It is not surprising that the general public cannot make head or tail of the coal situation.—Yorkshire Post.

> *In economic terms house coal is still too cheap, and that is undoubtedly one factor in the present shortage. . . In the long run house coal is bound to be both scarcer and dearer.—Financial Times.*

The lesson which emerges from the numerous credit exhortations and controls of recent years is the length of the time-lag which occurs between their utterance or imposition and their effect on the economy. They are often out of date before they become effective.—MR. D. J. ROBARTS, chairman of the National Provincial Bank, Limited.

BELGIAN STEEL industry reports the loss in production of 610,000 metric tons, or approximately one month's output, as a result of the recent strike.

SHAFT-SINKING RECORD

Achievement at New Kellingley Colliery

ALL-TIME British record for shaft sinking has been set up at Kellingley Colliery in the North-Eastern Division of the National Coal Board by the Thyssen Shaft Sinking Company, Limited. The new record for the calendar month of January is 338.97 ft. of completed shaft sinking. The Kellingley project, which is in the No. 8 (Castleford) Area, on the eastern edge of the Yorkshire coalfield, gives effect to the NCB's plan to meet the increased demand for good quality coals. Two shafts of 24 ft. finished diameter are being sunk, using the latest techniques.

The previous record was held by Kinnear Moodie & Company, Limited, who sank the shafts at Parkside Colliery in the North-Western Division, under the supervision of South African engineers. The record for a four-week period was also held at Parkside when 282 ft. sunk and 285 ft. lined was achieved. This record was also broken by Thyssen Shaft Sinking Company with 297 ft. sunk and 320 ft. lined with concrete, for the four weeks January 2-29.

Kellingley is the first completely new major colliery—estimated to cost nearly £8,000,000—to be planned by the board in the North-Eastern Division, and when in full production towards the end of 1964, it will produce about 6,000 tons of saleable coal a day.

The colliery will be highly mechanized and employ 3,000 men. It will be all-electric and is expected to have a useful life of 130 years. Workable reserves amount to more than 200,000,000 tons and the proposed annual saleable output is almost 1,500,000 tons. For the first 50 years the output will be extracted from the Silkstone and Beeston seams, which lie at depths of 2,087 ft. and 2,298 ft. respectively.

Smokeless Briquettes from Coal Slack in a Year?

SMALL quantities of smokeless briquettes produced from small coal and slack are expected to be available from National Coal Board experimental plants by the end of this year, or early next year, and it is planned to produce 1,000,000 tons by 1965. The pilot plants, one at Birch Coppice (Staffs), and the other at Graigola, South Wales, are at present producing experimental smokeless briquettes by two different processes, one by employing a method of fusing the small coal and slack, and the other by using a binding agent. The search for a suitable binding agent has hitherto been the stumbling block to the production of satisfactory briquettes.

Between now and 1965 the Coal Board plans to spend up to £20,000,000 on developing new smokeless fuels, and hopes that by 1970 smokeless fuel will take the place of about 19,000,000 tons of household coal. The board has at present about 29,000,000 tons of small coal and slack in stock—far more than the amount needed to meet power-station requirements.

Nearly Half-century in Coal Mining

AFTER 48 years in the coal-mining industry, Mr. Harold James Atkinson retired from the post of general manager, No. 6 (North Barnsley) Area of the North-Eastern Divisional Coal Board on Tuesday. Mr. A. Holdsworth, previously Area production manager of No. 6 Area, will take over as acting general manager.

Mr. Atkinson, who was born in 1897, was educated at Dronfield Grammar School and Sheffield University, and apprenticed as a mining engineer at Tinsley Park Colliery, Sheffield, in 1912. Between 1920 and 1939 he was undermanager of Garforth Colliery, and manager and later agent of Steetley and Whitwell collieries. He became agent of Wharncliffe Silkstone Colliery, near Barnsley, in 1939, being promoted to general manager and agent of that colliery and Old Silkstone Colliery in 1944. He had been general manager of the No. 6 Area since vesting day.

A member of the Institution of Mining Engineers, Mr. Atkinson was president of the Midland Institute of Mining Engineers in 1958-59. He was made OBE in 1955 for services to the mining industry.

New Drift Mine in Derbyshire

PLAN to develop a drift mine in South Derbyshire with an annual output of 1,000,000 tons of coal a year, which was referred to at a recent Press conference of the East Midlands Divisional Coal Board, has been further clarified in a statement by the board. A spokesman said that it was a long-term plan unlikely to be started before 1965. The planning was in early stages, but use might be made of existing surface buildings, although the drift would to all intents and purposes be a new colliery.

The location would probably be in the Church Gresley area and the mine would employ between 1,500 and 2,000 men.

AMERICAN FIRM, Leeds & Northrup Company, of Philadelphia, recently acquired all shares not previously owned by it in Integra, Leeds & Northrup, Limited, makers of electrical measuring instruments, heat treating furnaces, etc., of Birmingham, which has changed its name to Leeds & Northrup, Limited. The parent company will provide capital for new works and offices, and an expansion programme for plant and equipment. Mr. J. W. Robins, until recently president of Leeds & Northrup, Canada, Limited, will join Mr. J. J. A. Rogister as joint managing director.

Personal

Brains Trust Chairman in Last of Series

MR. NORMAN FISHER, principal of the National Coal Board Staff College, and a regular chairman of the BBC Television Brains Trust since 1956, made his appearance in the last of the current series of the programme yesterday (Thursday).

MR. NORMAN FISHER

Mr. Fisher has long been associated with broadcasting. He was chairman of the BBC North Regional Advisory Council from 1953-55, and in 1955 succeeded Lord Radcliffe as chairman of the BBC General Advisory Council. He became well-known as a broadcaster in the North as chairman of many of the weekly debates of the "51 Society." Educated at Cardiff High School and St. Edmund Hall, Oxford, Mr. Fisher was assistant to the education secretary for Cambridgeshire from 1938-46, deputy education officer for Lancashire from 1946-49, and chief education officer at Manchester from 1949-55. He conducted an inquiry into education in Hong Kong in 1950.

Ald. COLIN DEWS, a maintenance bricklayer at Glass Houghton Colliery (Yorks), has been chosen as the next Mayor of Castleford.

Sales training manager of Perkins Engines, Limited, Mr. T. H. L. PARRISH, is to spend three months in the US and Canada lecturing on sales features of Perkins engines.

Sir MILES THOMAS, chairman of Monsanto Chemicals, Limited, and chairman of the Development Corporation for Wales since 1958, has been appointed chairman of the Welsh Advisory Committee for Civil Aviation.

Mr. JEREMY FRY, a director of Rotork Engineering Company, Limited, Bath, which is engaged on a £40,000 contract in India and has a £250,000 Russian contract in hand, is making a round-the-world business trip for the company.

Manager of Whitwick Colliery (Leics), since 1940, Mr. WILLIAM HALL is to retire at the end of the month. He began his career as a pony driver at the old Ibstock Colliery and for his services to the mining industry he was made MBE. Mr. Hall has been a member of the National Association of Colliery Managers for many years.

Chairman of Imperial Chemical Industries, Limited, Mr. S. P. CHAMBERS left on Saturday for a visit to India and Pakistan which will last until February 19. It is his first visit as chairman of ICI to the subsidiary companies in India and Pakistan. For some years before the war Mr. Chambers acted as Taxation Adviser to the Indian Government and was a member of the Council of State.

Among the members of a goodwill trade mission which is to visit Poland at the end of the month at the invitation of the Polish Chamber of Foreign Trade, is Mr. A. D. DODDS-PARKER, Head, Wrightson & Company, Limited, Thornaby (Yorks). The mission aims to gain a first-hand impression of the Polish economy and market and to demonstrate the interest of UK business in Poland.

Mr. R. S. H. CAPES has retired after 27 years as secretary of Dorman Long & Company, Limited, which he joined in 1923. He is succeeded by the assistant secretary, Mr. J. M. ARMSTRONG. Manager of the company's Cleveland works for the past eight years, Mr. PERCY WOOLAS has also retired. He joined the company in 1911 and was appointed assistant works manager at Cleveland in 1949.

Mr. DAVID A. CASSELS, overseas manager of NCK-Rapier, Limited, a member of the Newton-Chambers & Company, Limited, group, left the UK last week on a tour of India, Malaya, and Ceylon. His visit to India coincides with arrangements being completed for NCK-Rapier to be represented by an Indian engineering firm capable of partial manufacture of machines.

On the invitation of the London organization of Consolidated Zinc Corporation, Limited, Mr. P. W. ROBINSON has accepted an appointment associated with the development of the corporation's aluminium interests. He has been released by the directors of the Rio Tinto Mining Company of Australia, Limited, from his post as deputy managing director of that company.

Mr. ION Y. LANE, a director of Coseley Buildings, Limited, Wolverhampton, and an expert in prefabricated industrial and domestic buildings, left this country last weekend for a six months' tour of the Far East. He will visit Singapore, Malaya, North Borneo, Sarawak, Brunei, Viet Nam, Thailand, Dutch New Guinea, and the Philippine Islands. His company has supplied prefabricated steel buildings in connection with industrial expansion in many parts of the world.

Mr. GEORGE L. L. STONE, metalliferous mining consultant to the general engineering division of the General Electric Company, Limited, who has retired, was a student at the Royal School of Mines from 1908 to 1912. He specialized early in mineral dressing, and after various appointments abroad joined GEC at Fraser & Chalmers Engineering Works, Limited, in 1943. He took up his last appointment in 1958. Mr. Stone was presented with a television set at a farewell ceremony at the company's Erith works.

Golden Eye Club Awards

FIVE men, members of the Golden Eye Club, who have escaped serious injury to their eyes by wearing goggles at work, received presentations in London on Tuesday, from Sir Howard Roberts, president of the Royal Society for the Prevention of Accidents, who formed the club.

One of the men, Mr. James Gilbert, 40, has been employed as a turner by Owen & Dyson, Limited, a branch of the United Steel Companies, Limited, for over 24 years. A founder-member of the club, he was machining a railway wagon axle when a piece of hot swarf struck his safety spectacles with such force that it embedded itself in the left hand side-shield. "I should have lost an eye if I had not been wearing the glasses," said Mr. Gilbert.

Mr. Colin Umney, 21, is the youngest of the founder-members, and works as an ironfounder with the Staveley Iron & Chemical Company, Limited, Chesterfield. He was standing near a moulding box, being cast with molten metal, ready to skim off the floating slag when the top of the box exploded and flew into his face. Although he had other injuries his eyes were protected by goggles. Mr. Umney said, "I had been wearing safety glasses for only a few weeks when the accident happened."

Company News

OUTLOOK FOR SCOW

Production Maintained and Prospects "Good"

MARKET conditions for the company's products at present "do not justify a pessimistic outlook," Mr. Harald Peake, chairman of the Steel Company of Wales, Limited, told the annual meeting in London on Monday. It was disappointing, however, that production of steel sheet, plate, and tinplate for the first 16 weeks of the current year had been only the same as last year, because production capacity had increased.

Mr. Peake said that world economic conditions were rather more favourable than they were a few months ago, and there were signs of increasing confidence, without which international trade could not expand. Much of the company's domestic market was of a seasonal nature, and increased orders for both steel sheet and tinplate could be expected shortly. The electrical and general engineering industries were busy, and orders from them continued to show an increase compared with a year ago.

Mr. Peake said that the company was pressing on with its fourth development plan, and good progress was being made. He summed up: "It is too early to forecast the profits for the current financial year. We are now experiencing increased costs in respect of coal and wages. There is also increased competition in the export markets. I have no hesitation, however, in adhering to the view expressed in my chairman's statement that the prospects are good."

Rise in Current Outputs by Dorman Long

IN the first three months of the current financial year, demand for rolled steel products had been maintained at a high level, said Sir Ellis Hunter, chairman of Dorman, Long & Company, Limited, at the annual meeting on Wednesday. Outputs of ingots and of rolled steel for the three months to December 31, 1960, were in excess of those for the same three months of 1959, but there was a lower tonnage of some products on the forward order-book today than in September, 1960. Universal beams were readily available, and he urged structural designers to "use them to the full" to cut capital investment costs.

Commenting on steel production costs, Sir Ellis said that recent cost increases, including higher wages and coal and coke prices, had not yet been reflected in prices for rolled steel, and as a result there was a continuing depletion of margins for depreciation and profit.

At an extraordinary meeting afterwards, a proposal to increase the authorized capital from £30,000,000 to £50,000,000 by creating an additional 20,000,000 unclassified £1 shares was approved. Sir Ellis said the board considered it advisable to increase the authorized capital "to something more in proportion to the company's organization, undertaking, and activities." There was no question of any immediate issue. There was an admitted need at some later date for additional money, though not at present, and the board had no negotiations in hand to that end.

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—Offers made to acquire the preference and ordinary capital of the Churchill Machine Tool Company, Limited, are now unconditional. They remain open for acceptance until further notice.

BENJAMIN PRIEST & SONS, LIMITED, nut and bolt manufacturers, etc., of Old Hill (Staffs)—The capital has been increased to £272,750 by the creation of 25,000 ordinary 5s. shares ranking *pari passu* in all respects with the existing ordinary shares.

ATLAS STONE COMPANY, LIMITED—Present capital expenditure programme is due for completion by the end of this year, and subsequent programmes will be considered in the light of prevailing conditions. Group net profits for the year 1959-60 were £94,081 (£78,609), after tax of £91,865 (£78,689). A one-for-four scrip issue is proposed.

COZENS & SUTCLIFFE (HOLDINGS), LIMITED—Offer of 653,788 4s. ordinary shares to shareholders at 10s. 6d. each has been taken up to the extent of 96 per cent. of the issue. Of the remaining shares, applications for up to 34 shares were allotted in full and applications for over 10,000 shares will get approximately 16 per cent. of their requirement.

DOWTY GROUP, LIMITED—Share and cash offer worth over £2,100,000 has been made for the entire issued capital of Boulton Paul Aircraft, Limited, Wolverhampton. Terms are 8s. in cash and one 10s. Dowty ordinary share for every two 5s. ordinary units of Boulton Paul, ex-dividend. The Boulton Paul board is recommending acceptance.

UNITED STEEL COMPANIES, LIMITED—Of the 10,000,000 new ordinary shares offered to ordinary shareholders of the company at 20s. per share, acceptances have been received in respect of over 99 per cent. The balance, 92,802 shares, has been sold for the benefit of the ordinary shareholders to whom such new shares were provisionally allotted.

SMITH & WELLSTOOD, LIMITED, ironfounders and heating appliance manufacturers, etc., of Bonnybridge (Stirlingshire)—Turnover and profits of the group for the six months to December 31, 1960, show an increase against the corresponding period of 1959. Interim dividend is raised to 3¼ (2½) per cent., an increase which in view of the uncertainty of the economic climate and the effect of increased costs in reducing profit margins, must not be taken as implying an increase in the total dividend.

GENERAL ELECTRIC COMPANY, LIMITED—Interim

dividend is maintained at 3 per cent. for the year ending March 31, 1961. Provisional results for the first eight months' trading and the estimated figures for the remainder of the current financial year indicate that the profit for the year will be somewhat lower than last year, mainly due to reduced trading in the radio and domestic equipment groups. Progressive changes are to be made in administrative structure, and further steps to strengthen the management are planned.

BARNSLEY DISTRICT INVESTMENT COMPANY, LIMITED—The existing arrangement whereby two thirds of the company is controlled by Barrow Barnsley (Holdings), Limited, and the remainder by Wombwell Coke & By-Product Company, Limited, is to end. Barrow Barnsley (Holdings) has made a bid of 2,664,032 new 5s. shares for the Wombwell Coke holding. If the bid is successful the existing assets of the investment company will be transferred to Barrow Barnsley (Holdings) and the investment company will become dormant.

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—Expansion is limited by the inadequate supply of technicians and operatives, states Mr. Tom C. Firth, the chairman, but everything is being done to improve the position by training young men. The current year started with a good order-book and "another satisfactory year of trading" is expected. The group can only continue to prosper, Mr. Firth says, by improving efficiency and increasing output. Manufacturing and selling costs are higher and due to competition, margins are lower.

JOHN FOWLER & COMPANY (LEEDS), LIMITED—The locomotive division has shown a little improvement, but competition is becoming so severe that, despite the widening of the company's range and the technical success with new models, this side of the business is still very difficult, states the chairman, Mr. Arnold Carr, who adds that the directors will be in a better position to assess the future of this business at the end of the present trading year. The steel foundry at Sprotborough had a very good year, contributing well to the company's earnings, as a result of the high standards of technique and team spirit in the plant.

New Davy-Ashmore Company to Develop Oversea Sales

NEW subsidiary, the Davy-Ashmore Export Company, Limited, has been formed by the Davy-Ashmore, Limited, group, to manage and develop the oversea selling and engineering organization and to promote a further extension of the group's export trade in capital goods. The main activities of the group are in the fields of iron and steel, chemical, petrochemical, gas, and petroleum engineering.

Directors of the new company are Mr. M. A. Fiennes, chairman, Mr. D. L. Campbell, managing director, Mr. D. M. R. Brown, Mr. M. F. Dowding, Mr. T. K. Hargreaves, Mr. C. Robson, Mr. R. W. Rutherford, Mr. H. M. Sutherland, and Mr. H. H. Utley. Mr. L. Davis is secretary.

The Davy-Ashmore group includes Ashmore, Benson, Pease & Company, Limited, Davy & United Engineering Company, Limited, Davy & United Instruments, Limited, Davy & United Roll Foundry, Limited, the Power-Gas Corporation, Limited, Rose, Downs & Thompson, Limited, and associated oversea companies.

In Parliament

SALE OF KRUPP HOLDINGS

RAISING the question of the disposal of the Krupp coal and steel assets, MR. EMANUEL SHINWELL (Lab.), pointed out that discussions on the sale of the holdings had now been going on for eight years. He suggested it was obvious that the Government and the allies concerned now had no intention of realizing the holdings, but intended that they should be retained by Krupp. The Labour Government, he recalled, had considered the matter from all aspects and decided that the holdings should be retained as a national concern in Germany.

MR. EDWARD HEATH, Lord Privy Seal, replied that the Mixed Committee of Experts, which had recently granted a further extension of time until January 31, 1962, for disposal of the assets, operated under the terms of the Bonn Settlement Convention, and it could not have granted an extension of time to 1962 unless it was satisfied that reasonable efforts to sell had been made, and that no satisfactory offer to buy had been received.

DEMOLITION OF COAL EXCHANGE

PLEA by MR. TOM DRIBERG (Lab), for the saving of the Coal Exchange in the City of London from demolition, was answered by SIR KEITH JOSEPH, Parliamentary Secretary to the Ministry of Housing, who said that the Exchange stood in the way of vital road improvement. Despite the considerable architectural interest in the structure of the building, its retention on the present site was not justified.

MR. DRIBERG pointed out that experts had said that it would be easy to remove quite a small part of the Custom House without doing any damage, at the same time ensuring the vital road development. SIR KEITH JOSEPH replied that the road must interfere with one of the two buildings, of which the Coal Exchange was considered the "less outstanding."

PROPOSED railway boards will be given the power to produce their own rolling stock and motive power units and equipment under the forthcoming Bill to deal with the railways, the Minister of Transport announced.

ASKED BY Mr. J. Griffiths (Lab.), for the rate of disabling sickness and deaths due to bronchitis and emphysema among coal miners in 1960, and the comparable figure for the whole insured population, the Minister of Pensions and National Insurance said in a written answer that up-to-date figures were not available, but a start would be made in June, 1961, to collect information which would provide these facts in the future.

LANCASHIRE DYNAMO AGREEMENT WITH US COMPANY

LICENCE agreement has been concluded by Lancashire Dynamo Electronic Products, Limited, a Metal Industries, Limited, subsidiary, with the Emerson Electric Manufacturing Company, of St. Louis, Missouri, US, under which the American company will have the right to make, on a royalty basis, the complete Lancashire Dynamo range of electronic control equipment which has been designed over the past 15 years.

Products which could be made under the agreement include machine tool control systems, recorder controller instruments for process industries, and adjustable speed drives.

COAL SHORTAGE "LOCAL"

No Resumption of Domestic Imports, Says NCB

DENIAL that there is a national house coal shortage, or any intention of resuming coal imports, was issued on Monday by the National Coal Board. A spokesman agreed that there were local shortages, but said that on January 14, undistributed stocks of house coal totalled 1,160,000 tons—about 10 days' supply. The shortage, he said, was confined to certain areas, with the West Midlands appearing to be the worst hit.

Mr. Ronald Matthews, assistant general secretary of the Coal Merchants' Federation of Great Britain, said that "a tight situation exists fairly generally, but provided the weather does not become unduly severe during the next six weeks, there is no cause for anxiety." In contrast with previous years, there had been a very heavy demand for household coal for some months, and the NCB had sold about 2,000,000 tons more than last winter.

Complaints of shortages have come mainly from the Midlands. The Coventry Coal Merchants' Association referred to a "desperate" shortage, and said that Mr. Alfred Robens, who took over from Sir James Bowman as chairman of the NCB on Wednesday, had been asked to receive a deputation.

Rationing System

Coal merchants are operating a rationing system in Burton-on-Trent and other Midland towns, where supplies of domestic-type coal are reported to have been cut by half. A spokesman for the East Midlands board said: "The shortage affects only one limited section of one market. There is no shortage of smokeless fuel or premium grade fuel, which is available in greater tonnage this year than ever before." Prepacked coal had made a large contribution to preventing shortage in many large cities, he added.

Miners' leaders in South Wales on Monday threatened a strike if coal imports were resumed. Mr. W. Whitehead, president of the local area of the National Union of Mineworkers, said after a delegate meeting: "Let them pay the miners properly, and this country will get all the domestic coal it needs." The delegates also opposed any resumption of Saturday working. Mr. Robens has suggested its limited reintroduction to meet the demand for house coal.

A spokesman for the Scottish Divisional Coal Board said on Tuesday that merchants' stocks of house coal are reported to be slightly in excess of the tonnages held at the same time a year ago. "Provided there is no extreme weather, while supplies will be tight, there does not appear to be cause for alarm." He pointed out that while consumption went up very rapidly in winter, output remained broadly the same, summer and winter, and the market relied on adequate stocking by merchants and householders. Merchants generally had stocked satisfactorily.

Since the beginning of last August, said the spokesman, the Scottish division has supplied through merchants 150,000 tons more coal to the domestic market than in the same period last year.

Commenting on Tuesday on reports of house coal shortages, Mr. J. W. Stewart, director of the Coal Merchants' Federation of Great Britain, said that there was no "national crisis." What was happening was that stocks at the pits, merchants' depots, and consumer cellars were running down more rapidly than usual at this time of year due to exceptionally wet weather, and everyone was more dependent on current arrivals at the depots. This had resulted in marginal shortages in a number of places, especially in the Midlands.

"The Coal Board, however, has made great efforts to increase domestic supplies, the railways have made special arrangements for bringing these forward, and the merchants have been delivering record quantities to consumers," said Mr. Stewart, who added that 2,500,000 tons more of domestic coal had been sold in the latter half of 1960 than in the same period in 1959.

Mr. Stewart said that the federation was in close touch with Coal Board headquarters and divisions, and had made various suggestions for increasing domestic supplies, including the reopening of opencast sites. The trade also hoped that miners would agree to the suggestion of the Coal Board to resume Saturday working at house coal pits. The large stocks at present held by the NCB were of industrial and not domestic coal.

£305,000 Gas Cleaning Orders for Lodge-Cottrell

SCARFER fume cleaning plant at the Spencer steelworks, Llanwern (Mon), of Richard Thomas & Baldwins, Limited, is to be supplied and erected by Lodge-Cottrell, Limited, Birmingham, a member of the Simon Engineering, Limited, group. The plant will consist of a precipitator, I.D. fan, ducting, dampers, chimney, and H.P. pumps. The work is worth approximately £54,000.

Lodge-Cottrell has also been awarded a contract by Guest Keen Iron & Steel Company, Limited, for a blast-furnace gas cleaning plant at its Cardiff works. This plant is worth £251,000 and will have two static washing towers and two precipitators. The contract includes crude and clean gas mains with valves, instrumentation and cables, water cooling, clarification and sludge pumps, cold and hot water and high pressure pumps, water mains and valves, H.T. rectifier transformer equipment, switchgear, motors, and starters. Designed to deal with 4,000,000 cu. ft. of gas an hour at n.t.p., the plant will clean down to 0.004 grain per cu. ft.

ON MONDAY, the telephone number of the Chronos Works, head office of Smiths Industrial Instruments, Limited, London, N.W.2, will be GLAdstone 6444.

Board Changes

Deputy Chairman for ISCON

CONSORTIUM of 13 leading British engineering companies, which as the INDIAN STEELWORKS CONSTRUCTION COMPANY, LIMITED (ISCON), is building the £120,000,000 Durgapur Steelworks now nearing completion near Calcutta, has appointed Sir Peter Roberts as deputy chairman.

SIR PETER ROBERTS

Sir Peter is chairman of the Wellman Smith Owen Engineering Corporation, Limited, and Newton, Chambers & Company, Limited, and is deputy chairman of Ransomes & Rapier, Limited. He is a well-known public figure in Sheffield and since 1950 he has been Member of Parliament for the Heeley Division, for five years before which he represented the Ecclesall Division in the House. He is a director of several industrial concerns in the area including Barnsley District Coking Company, Limited, Stave'ey Coal & Iron Company, Limited, Continental Casting Company, Limited, and Robinson & Kershaw, Limited, of which company he is chairman. In 1957 he was Sheffield's Master Cutler.

PRATT PRECISION HYDRAULICS, LIMITED—Mr. Glyn Mitchell has joined the board.

CHAMBERLAIN CONSOLIDATED, LIMITED—Mr. T. V. Emmerson has been appointed deputy chairman.

FALK STADELMANN & COMPANY, LIMITED—Mr. R. Stewart and Mr. E. Wilmot have retired from the board.

ALEXANDER FERGUSON (ENGINEERS & BRASSFOUNDERS), LIMITED—Mr. J. Douglas Latta has joined the board.

CROMPTON PARKINSON, LIMITED—Mr. Charles F. Dickson, a director since 1939, has been appointed vice-chairman.

MILLSPAUGH, LIMITED—Mr. A. M. Weldon has been appointed a director, and Mr. H. M. Smith has resigned from the board.

CEMENTATION COMPANY, LIMITED—Sir Frederick A. Pile has been elected chairman in succession to Mr. A. R. Neelands, who has become president.

ASSOCIATED FIRE ALARMS, LIMITED—Sir John Nott-Bower has joined the board. Mr. J. M. Hogan has been appointed secretary in place of Mr. E. A. McNeil, who has resigned.

VICKERS-ARMSTRONGS (ENGINEERS), LIMITED—Mr. A. E. Reddell has retired from the board and from his position of director-in-charge of the Weymouth works, on reaching the normal retiring age.

BALFOUR BEATTY (OVERSEAS), LIMITED—Mr. N. O. K. Johnson has joined the board. He has been general manager, Middle East, for the company and for Balfour, Beatty & Company, Limited

UNITED NON-FERROUS METALS, LIMITED—Mr. J. W. Simpson has been appointed a director and will continue as secretary of the company, which is a member of the Guest, Keen & Nettlefolds, Limited, group.

FOSTER TRANSFORMERS, LIMITED—Mr. J. M. Paul has been appointed managing director of the company and of Lancashire Dynamo Nevelin, Limited, both members of the Metal Industries, Limited, group.

BARTRAM & SON, LIMITED—Mr. G. C. Bartram, son of the chairman and managing director, Mr. R. A. Bartram, has been appointed deputy managing director. He joined the company in 1948 and was appointed a director in 1957.

SIEBE GORMAN & COMPANY, LIMITED—The board has been reconstituted, with Mr. C. C. Vinson as chairman, Mr. R. W. G. Davis, managing director, and Dr. L. Levy, Mr. L. S. Dawkins, and Mr. M. H. W. Wells, directors.

GEORGE KENT, LIMITED—Mr. Rodney Kent has been appointed deputy chairman, and Mr. Walter May assistant managing director. Mr. John G. Vaughan, managing director of the Charterhouse Finance Corporation, Limited, has joined the board.

ROAD MACHINES (DRAYTON), LIMITED—Mr. S. C. Tyrrell, a director of Ransomes & Rapier, Limited, has joined the board, following the recent agreement between the companies to co-operate in selling their products to the ready-mix concrete industry.

LITHGOWS, LIMITED—Mr. Ambrose Hunter, managing director of William Hamilton & Company, Limited, an associate company, has been appointed to the board. Mr. William B. Halliday, secretary of William Hamilton, has been appointed a director of that company.

WELLWORTHY, LIMITED—Mr. A. J. Woolcott, chairman and managing director, has relinquished his position as managing director for health reasons. He will continue as executive chairman. Mr. H. T. Hill, general manager and a director, has been appointed managing director.

BIRMINGHAM RAILWAY CARRIAGE & WAGON COMPANY, LIMITED—Sir Bernard Docker has resigned as chairman and managing director in order to be able to devote more time to his other interests. Col. F. A. Stanley, deputy chairman, has also resigned. Mr. Frank D. O'Brien Newman has been appointed acting chairman.

JOHN BROWN & COMPANY, LIMITED—Mr. H. Booker has joined the board of the subsidiary, Cravens, Limited, of which he is secretary. Mr. C. Walters, commercial local director of Markham & Company, Limited, another subsidiary, and its underground machinery manager, Mr. W. H. Spragg, and works manager, Mr. I. V. N. Williams, have been appointed to its board. Mr. Tom Mensforth has retired from the boards of Cravens and Markham.

New Furnace Will Double Darwins' Steel Output

NEW 3-ton electric arc furnace was commissioned last week at the Fitzwilliam works of Darwins, Limited, manufacturers of high speed and tool steels, etc., of Sheffield. The 1,800 kVA furnace was supplied by Birlec-Efco (Melting), Limited, Aldridge (Staffs), and with ancillary plant cost about £50,000. Its eventual output of 100 tons a week, on two-shift working, will effectively double the melting capacity in the foundry.

Products of the furnace will all be high grade steels, particularly high speed steels. Though some will be used in the foundry, more will be converted from ingots into steels for direct use by tool manufacturers. The furnace will also supplement production capacity at Andrews Toledo, Limited, a subsidiary of the Darwins group.

New Plan for French Steel

25,000,000 INGOT TONS TARGET FOR 1965

From our Special Correspondent

FRENCH steel production last year reached 17,200,000 (metric) ingot tons, of which over 5,000,000 tons were exports. French steelmakers are thus confident of reaching the target set by the third modernization Plan, which provides for a capacity of 18,500,000 tons this year. At the same time, as the period covered by the third Plan nears its end, the outlines of a fourth Plan ranging from 1962-65 are already being worked out.

Preparatory work for this fourth Plan is being conducted by a special commission including representatives of the State, the steel industry, and consuming industries, and is based on the assumption that the country's gross national product is to increase by a yearly average of 5.5 per cent. over the period—a growth which would require the steel industry to supply the home market with more than 19,000,000 ingot tons in 1965.

With an expected balance of steel exports over imports of 3,000,000 tons, however, steel production will have to be at least 22,500,000 ingot tons if both home and export requirements are to be fulfilled, and allowing the necessary margin of elasticity, production capacity should range between 24,000,000 to 25,000,000 ingot tons.

More Pig-iron Capacity

At the present stage in the commission's work, no definite details are available of the investment programme which will enable the French steel industry to reach this overall target by 1965. It can be assumed, however, that particular stress will be laid upon the development of pig-iron production capacity, so as to avoid difficulties caused by scrap shortages; the building of new large blast furnaces, such as is now going ahead at Joeuf and Dunkirk; and the improvement of efficiency in existing blast furnaces by fuel-oil or gas injection. An advance in the use of oxygen in steelmaking can also be expected, and according to one estimate oxygen-steel may account for 25 to 30 per cent. of the total steel production in 1965.

Special efforts can be expected in the field of blooming mills, which may prove to be a bottleneck to output in some plants. The required increase of capacity in this sector may be obtained by installing new equipment, or by applying automation to existing plant. The building of new continuous casting equipment is likely, and the development of rolling capacity for sheets, narrow strip, wire rod, and merchant bars can be forecast.

The total investment required by the fourth Plan, on the basis of preliminary estimates, should range between £650,000,000 and £700,000,000, and French steelmakers consider that, provided Government policy allows them to find in their sales prices a sound economic margin, the target set for 1965 is not unrealistic.

UNDERMANAGER OF Bates Pit, Blyth (Northumberland), since 1955, Mr. Philip Linsley has been appointed to a similar position at Gedling Colliery, Nottingham.

Lower Profits Estimate for United Steel

CONTINUING fall in motor car output and in durable consumer goods since the turn of the year had affected the dependent departments of the United Steel Companies, Limited, Sir Walter Benton Jones, chairman, told shareholders at the annual meeting on Thursday of last week. The production of hot rolled strip was the most affected "and now causes us some anxiety," he said. Special efforts were being made to recruit alternative business including exports.

On the other hand there had been increased demand from other customers, particularly those connected with the production of capital equipment. "This factor, together with our wide variety of steel products enables us to state that present order loads for the great majority of our products are satisfactory," he said. Production and turnover in the first quarter of the current year had kept in step with the performance of previous years and subject to there being no decline in the total level of industrial activity, Sir Walter thought that output should be maintained at a satisfactory level for the rest of the financial year.

He pointed out that the recent rises in the price of coal and wages had, so far, been met with no adjustment in prices. "Taking these increases into consideration," he said, "we estimate that our results for the current financial year will be 10 per cent. to 15 per cent. less than those for last year."

On the subject of exports, Sir Walter maintained that although our exports increased year by year, that did not mean that they could not increase more quickly. "But it is not just a matter of pressing buttons," he added. "Many other countries also want to increase their exports and competition in price, time of delivery, and terms of credit may determine what countries are most favoured by foreign buyers." Help from the Government—and in particular in a reduction of taxation—would help Britain to meet that competition, he declared.

PURCHASE OF a de Havilland Dove 8 aircraft by J. C. Bamford (Excavators), Limited, of Rocester (Staffs), will speed the travel of executives between this country and the Continent, where most of the company's principal export markets are situated. Bamford exports 43 per cent. of its hydraulic excavators and, as well as carrying personnel, the aircraft will be used to deliver spares quickly when required.

Mining Engineers Honour NCB Deputy Chairman

TRIBUTE was paid to Mr. E. H. Browne, deputy chairman of the National Coal Board, by the presentation of the Institution Medal at the 67th annual general meeting of the Institution of Mining Engineers, held in London last Friday.

MR. E. H. BROWNE

In making the presentation, Mr. R. G. Baker, the retiring president, said it was the highest award the Institution could make. It was given in recognition of Mr. Browne's service to the mining industry, especially during that period when, as director-general of reconstruction, he led the large-scale reorganization of the industry immediately after nationalization. In reply, Mr. Browne said that although his destiny seemed to take him farther and farther away from mining engineering, he always regarded himself as a mining engineer. He was, therefore, deeply appreciative of the honour bestowed upon him.

Mr. Browne became director-general of production in 1949 and was made CBE in January, 1952. He was appointed chairman of the West Midlands Divisional Coal Board in 1955 and took over his present office in September last year. He is the fourth living mining engineer to ho'd the Institution medal—the others are Sir Charles Reid, Sir Andrew Bryan, and Mr. John Brass, Sen. He was president of the Institution in 1957-58.

Also at the meeting, a certificate of honorary membership was presented to Prof. J. Ivon Graham, who, until his retirement was Professor of Mining at the Otago School of Mines, University of New Zealand. In his absence, the certificate was received by Prof. J. C. Mitcheson, Professor of Mining at the Royal School of Mines, London University.

The award was for Prof. Graham's great contribution to mine safety, especially his research into mine gases and spontaneous combustion. A letter of appreciation was read by Prof. Mitcheson in which Prof. Graham paid tribute to Lord Haldane, who, until his death, was director of the Coal Owners Research Laboratories.

The Douglas Hay Medal was presented to Mr. A. B. Dawson, and was received in his absence by Sir Andrew Bryan. Sam Mavor Students' prizes were awarded to Dr. Peter Shuttleworth and Mr. F. F. Roxborough.

The new president, Mr. R. A. Moore, was inducted and abstracts from his presidential speech appear on p. 251.

RUHR COAL PRODUCERS, Gelsenkirchener Bergwerks-AG, which has already announced the closing of three of its pits in Bochum, is also to close by the end of next year the Bochum pit, Bruchstrasse.

French Coal Stocks Up, Production Down

FRENCH coal stocks rose by a further 800,000 metric tons in 1960, despite a 2½ per cent. fall in production to 58,300,000 tons, according to Charbonnages de France, the State body controlling about 98 per cent. of the country's coal mines. This increase contrasts with stock decreases in all other West European countries, including Germany where there was a fall of 4,000,000 tons. The rise in stocks is attributed to a 23 per cent. increase in the use in France of hydro-electric power—equivalent to 3,000,000 tons of coal. In addition, mineral oil and natural gas made further inroads into the country's coal demands.

By 1965, France plans to have fixed annual coal output at 53,000,000 tons by further rationalization of the industry. Annual output of the Lothringian coalfield is to be cut by that year from 14,700,000 tons to 13,500,000 tons, and that of the Centre-Midi from 13,300,000 tons to 11,450,000 tons, while the yearly production in the Nord and Pas-de-Calais areas will be cut from 28,900,000 tons to 28,000,000 tons.

Productivity is rising, output per manshift having increased by 7.5 per cent. to 1,815 kg., while the numbers employed fell from 196,143 to 181,113.

New Principal Electrical Inspector of Mines

APPOINTED to succeed Mr. J. Cowan, who is retiring from public service, Mr. D. E. Fox took up his new post as HM Principal Electrical Inspector of Mines and Quarries yesterday (Thursday). He was previously deputy principal.

Born in South Wales in 1917, Mr. Fox was educated at Amman Valley Grammar School and the University College of Swansea, where he graduated B.Sc. (Wales), electrical engineering, in 1939. Following a post-graduate course with the General Electric Company, Limited, he joined the Ministry of Supply in 1941, where he held various technical appointments until 1946. Mr. Fox then spent a year with Powell Duffryn, Limited, before joining the National Coal Board as group electrical engineer in 1947.

Entering the Mines Inspectorate in 1949, as an electrical inspector of mines and quarries, he served with the South-Western Division until 1957, when he was appointed deputy principal electrical inspector and transferred to headquarters in London. Mr. Fox is a past president of the South Wales branch of the Association of Mining Electrical and Mechanical Engineers.

NCB and People in Glasshouses

HORTICULTURALISTS from many parts of Scotland attended an exhibition held by the Scottish Divisional Coal Board at Lanark recently, to demonstrate the advantages of converting their glasshouses from hand-fired boilers to mechanical stoking. The introduction of such modern heating techniques would enable growers to burn, without smoke, the cheaper bituminous fuels in place of anthracites.

Mechanical stokers from eight different firms were demonstrated and there was also a section showing a small range of modern domestic solid fuel appliances. Full details of the NCB's loan scheme were explained.

Obituary

MR. H. W. HEMBRY

Finance Director of National Coal Board

FINANCE member of the National Coal Board since January, 1957, Mr. Henry William McQuitty Hembry died at his home in London on Wednesday at the age of 57. In 1945 he was made controller of colliery assets and chief of the finance branch of the Coal Control Group for Germany, and later deputy chairman (British) of the Combined Coal Control Group for Germany.

Mr. Hembry joined the National Coal Board in February, 1950, when he was appointed finance director of the Northern (N&C) Division, and in the spring of 1955 he was made deputy chairman, which post he held until his appointment as finance director of the board. He was also chairman of the Opencast Executive.

MR. H. W. HEMBRY

Educated at the Methodist College, Belfast, and at Liverpool College, Mr. Hembry was articled to Banner Spencer & Company, Limited, in 1921, and qualified as a chartered accountant in 1927. From 1926 to 1928 he was chief accountant of the Belfast Omnibus Company, Limited. For 10 years before the war, he was secretary and chief accountant of Low Temperature Carbonization (Coalite), Limited. During the second world war he served in the Royal Artillery in Africa, the Middle East, and Germany, rising to the rank of lieutenant-colonel.

Former alderman of Darlington Town Council, Mr. PEARSON HARRISON, who until his retirement in 1946 was a steel moulder at Darlington Forge, Limited, died on Monday aged 94. He helped to establish Darlington Trades Council.

While on a visit to India on company business, Mr. J. W. URBAN, a director of Monsanto Chemicals, Limited, since 1954, died on Tuesday. He was a director of Alta Laboratories Private, Limited, Bombay, and of Monsanto Chemicals of India, Limited, and Monsanto Plastics, Limited.

The death has occurred of Mr. HERBERT HODGKIN, a director of Mellowes & Company, Limited, metal window manufacturers, etc., of Sheffield. He was 65. Mr. Hodgkin had been with the firm for more than 40 years and had been a director for the last 15 years. He was also a director of Doodson & Bain, Limited, and served on many committees connected with the metal window industry.

Chairman and managing director of George Brown & Company (Marine), Limited, shipbuilders, of Greenock, Mr. GEORGE ALFRED BROWN has died at the age of 71. He joined his father's firm as an office boy in 1905, qualified as a draughtsman, and after holding the post of chief draughtsman, became manager and subsequently a director of the company. On his father's death in 1932 he became managing director. He was a member of the Royal Institution of Naval Architects, the Institution of Engineers and Shipbuilders of Scotland, and of the Foremen Engineers' Association.

Prof. S. N. SHIMMIN, head of the department of social studies, Leeds University, from 1945-54, who has died at the age of 72, was known nationally through his membership of the Industrial Disputes Tribunal. He became a member of the National Arbitration Tribunal in 1941, and continued on its peace-time counterpart. In 1950 he was chairman of the inquiry into a dispute involving 100,000 miners in South Wales coalfields. He was chairman of several wage councils and trade boards, and was made CBE in 1951.

Coal Industry Needs More Mechanization—and Men

FUTURE of the coal industry depended on its ability to compete with other sources of heat such as oil and natural gas, Mr. H. W. Longden, chairman of the West Midlands Divisional Coal Board, said last week. That would mean even greater mechanization of the industry both on the surface and underground. Speaking at the annual prize distribution at the mining department of the North Staffordshire College of Technology, he said that it would also mean that an increasing number of qualified men would be needed.

After more or less marking time for the past two or three years, Britain's coal industry was on the way up again and it needed the college's help in order to educate a sufficient number of qualified men. "Over the years the Coal Board has moved in the direction of giving opportunities to more people rather than to fewer," he maintained. In the industry at the present time there were more than 20,000 students receiving further education.

CONSUMPTION of copper in all forms during December declined by 18 per cent. to 56,279 tons, and that of tin by almost 25 per cent. to 1,588 tons, according to advance figures issued on Wednesday by the British Bureau of Non-Ferrous Metals Statistics. Consumption of lead and zinc in December fell by 10 per cent. and 12 per cent., respectively.

Appointments

GEC's New Commercial Manager at Witton

NEW commercial manager of the Witton engineering works of the General Electric Company, Limited, is Mr. F. J. B. Barry. He joined GEC in 1955 as manager of the plant liaison department in London.

MR. F. J. B. BARRY

Mr. Barry began his career with Metropolitan-Vickers Electrical Company, Limited, in 1923 as a school apprentice. When he finished his training he joined the sales staff, serving in the marine department, the turbine sales department, and in 1936 in the special contracts department.

During the war he was seconded to the Ministry of Supply and appointed deputy director of weapon production. He returned to Trafford Park in 1945 as assistant sales manager and four years later was promoted to sales manager.

Mr. Barry was closely connected with the inquiry into some sections of the electrical industry by the Monopoly Commission and serves on a number of the industry's committees.

Industrial products division of the North British Rubber Company, Limited, has appointed Mr. COLIN MCINNES as field sales engineer with special responsibility for its conveyor belting activities.

MR. HUMPHREY BOTT has been appointed chief engineer of Fawcett Preston & Company, Limited, sugar machinery and hydraulic baling press manufacturers, etc., of Wirrall (Ches), a member of the Metal Industries, Limited, group.

Council of Industrial Design has appointed Mr. JAMES S. COUSINS to the new post of purchasing liaison officer. He will be concerned with the design policy of corporate buyers, such as industrial corporations, Government departments, etc.

Mr. E. F. COPPOCK has been appointed group financial controller to Metal Industries, Limited. He succeeds Mr. P. JARDINE who is taking up full time directorships with J. G. Statter & Company, Limited, and Minerva Mouldings, Limited, two MI subsidiaries.

MR. F. D. LOWEN has been appointed manager of the light power motor factory at Thorne, Doncaster, of Associated Electrical Industries, Limited. Mr. Lowen, who served a five-year apprenticeship at the Coventry works of British Thomson-Houston Company, Limited, has been superintendent at the Thorne works since 1953.

General manager of a newly created engineering division of Castrol, Limited, is Mr. RICHARD ADAMS, who joined Castrol last July. He has had over 25 years' experience with such companies as Monsanto Chemicals, Limited, and Kellogg International Corporation, designers and builders of oil refineries and chemical plant. His last appointment was as manager of the mechanical and electrical engineering division of George Wimpey & Company, Limited.

Progress of Portugal's First Steelworks

DETAILS of Portugal's first steelworks, being built on the River Tejo opposite Lisbon, have become available. The plant is being constructed for the Portuguese Siderurgia Nacional Sarl by a German-Belgium consortium consisting of Demag (Duisburg), Rheinstahl (Düsseldorf), Carl Still (Recklinghausen), and Sybetra (Brussels). The plant's blast furnace is almost complete, and with a capacity of 650 metric tons, will produce up to 210,000 tons of pig-iron annually. Apart from coke, the plant will be mainly independent of imports for its raw material requirements, but coke too will be produced locally as soon as a coking plant is erected on the site.

Initial raw steel output is fixed at 250,000 tons, with most of the production based on the Austrian oxygen blast process. A Linz-Donawitz convertor with a capacity of 30 tons is already assembled for production. Consumption will be the entire production of the blast furnace, plus some 40,000 tons of scrap. A 35-ton electro-arc furnace for processing backstream scrap has also been installed, with an annual capacity of 34,000 tons. The output of raw steel will be passed on to a rolling mill for processing into 200,000 tons of rolled products, divided approximately into 150,000 tons of light products (small profiles, wire, round steel, and strip for tube production) and 50,000 tons of medium products (angle iron, flat iron, girders, and light rails) a year. Eventual capacity of the plant will be about 1,000,000 tons of rolled products from 1,300,000 tons of raw steel. The plant will be brought into the first stage of production this summer.

Bulgarian Steelworks Project

STEEL complex to be erected at Kremikovtsi, near the Bulgarian capital of Sofia, will have an annual iron-ore processing capacity of 5,000,000 metric tons, with local reserves forming the basis of production. The two blast furnaces covered by the initial plan will have a combined annual capacity of 1,100,000 tons of iron. A rolling mill attached to a steelworks will produce ferro-concrete steel of diameters from 6 mm. to 30 mm., hot-rolled iron sheets of thicknesses between 2 mm. and 6 mm., and cold-rolled iron sheets between 0.18 mm. and 2.5 mm. thick.

A coking plant with an annual capacity of 700,000 tons, a tube rolling mill, a power station, Bulgaria's biggest machine-building plant, and railway and administration centres are planned for the works, which will employ some 15,000.

AS A RESULT of purchase from Uruwira Minerals, Limited, which until October mined lead, copper and silver at Mpanda, Tanganyika, George Cohen (East Africa), Limited, a subsidiary of George Cohen 600 Group, Limited, has for disposal several gas engine driven generating sets of 550 to 780 kVA capacity, a number of large diesel alternator sets, a 500 h.p. Nordberg hoist, items of mining plant and 42 miles of pipeline. Catalogues are being prepared, but inquiries are invited to George Cohen, Sons & Company, Limited, 600 Wood Lane, London, W.12, or to George Cohen (East Africa), Limited, P.O. Box 9535, Nairobi.

Iron and Steel Trade

PRICE ADJUSTMENT

For Larger Sizes of Non-alloy Steel Bars

MAXIMUM prices for the larger sizes of bright non-alloy steel bars are now " by arrangement between buyer and seller." This announcement by the Iron and Steel Board came into effect on Monday and concerns bright bars over $2\frac{7}{8}$ in. and for bright flats 5 in. wide and up by $\frac{1}{4}$ in. thick. The prices for flats are now expressed by a single basis price with extras for size instead of by a series of basis prices according to size.

This adjustment serves to correct an anomaly in the Board's list of maximum prices, since the larger sizes of bar constitute more of an engineering than a steel product. They are generally manufactured to a customer's specification and are used in such applications as ships' propeller shafts. The formulation of a maximum price is not, therefore, considered appropriate.

Pig-iron

Foundries using mainly the low phosphorus irons and hematite are well supplied and the situation now is that producers could step up deliveries if required. The overall demand for low phosphorus irons has shown a slight decline, but this grade still holds pride of place in the general call for pig-iron.

There is plenty of high phosphorus pig-iron to be had and a considerable quantity continues to be shipped abroad. Pig-iron producers still rely mainly on the steelworks to take the major portion of their outputs and there is no likelihood of change while scrap is scarce and irregular in flow.

Ferro-alloys

Demand for ferro-tungsten remains relatively steady and ferro-molybdenum and ferro-vanadium are fairly active. The 75 per cent. Si. and 45 per cent. Si. grades of ferro-silicon continue in reasonable request and ferro-manganese and silico-manganese are well supported. There is a specialized demand for supplies of ferro-sulphide and ferro-phosphorus.

Ferro-niobium is active and the demand for ferro-titanium shows general interest.

Semi-finished Steel

With the exception of reinforcing rods for which the call is still heavy, the re-rollers are experiencing an easing in the pressure for delivery of most products. Orders continue to come in regularly for small bars and light sections, but there has been a falling off in the quantities ordered. Demand for hot rolled strip and bright drawn bars have been adversely affected by the recession in the car industry.

The re-rollers are well provided with mild steel semis. They not only have reasonably good stocks but also the assurance that steelworks can meet current demands without difficulty. There is a good demand for all arisings at the steelworks of suitable re-rolling defectives and crops.

Finished Steel

The reduced demand for cold reduced sheets shows no signs of immediate improvement and extra tonnage can be taken up for inclusion in current rollings. There is a slightly better call for cold reduced strip, flat and corrugated galvanized sheet, and good commercial quality bright bars, but here again, further orders could be accommodated by most makers.

The demand for sections and joists has fallen away slightly, but it is still at a high level compared with most other finished steel products. Deliveries by the plate makers are, in some instances, behind schedule, but present difficulties should be overcome when new plant comes fully into operation. The call for colliery rails, arches, etc., is still disappointingly poor.

Iron-ore Imports

IMPORTS of iron ore and concentrates (except chrome iron ore) and roasted iron pyrites in December, and the totals for last year and 1959, are shown in the table below.

From	Month ended Dec. 31.	Twelve months ended December 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Sierra Leone	53,865	761,601	738,000
Canada	85,242	2,730,754	3,309,202
Other Commonwealth countries and Eire	1,000	24,809	25,584
Sweden	429,576	3,117,245	4,765,082
Norway	29,239	292,420	335,601
France	32,698	452,128	557,977
Portugal	26,561	260,728	377,463
Spain	39,838	520,036	742,309
Algeria	209,784	1,457,769	2,130,430
French West Africa	—	250,380	—
Tunisia	60,052	570,273	701,338
Morocco (excluding Tangier)	51,080	413,335	831,166
Liberia	48,366	365,056	542,400
Venezuela	134,818	1,395,889	1,620,298
Brazil	54,575	553,665	626,427
Other foreign countries	48,906	184,014	710,774
TOTAL	1,305,600	13,350,102	18,014,051

Dropforging Output Forecast

RECORD output for the dropforging industry is expected this year. The National Association of Drop Forgers estimates that its members will produce about 380,000 tons of forgings, to give a national output of about 700,000 tons. The industry is still operating at a high level of activity, with full-time working for those supplying the tractor, commercial vehicle, and general engineering industries.

Specialist dropforgers more closely allied to the car manufacturers are currently working at between 75 and 85 per cent. capacity.

Has Steel Capacity Overtaken Demand too Rapidly?

STRONGLY maintained demand for steel products last year meant that all the mills of Colvilles, Limited, worked at full capacity with a consequent favourable influence on both costs and earnings, Sir Andrew McCance, chairman, says in his annual statement.

SIR ANDREW McCANCE

As the year progressed, however, some weakness showed up in the export markets bringing intensified competition and low markets from foreign makers. "It is significant that in both the US and on the Continent there is a growing uneasiness that the expansion of capacity has overtaken rather too rapidly the expansion in demand and that productive capacity in excess of demand had indeed already been brought into existence. This fear may or may not be seriously based, but it is a warning that must be most carefully considered," Sir Andrew says.

He announced that the company has signed a reciprocal technical co-operation agreement with the Republic Steel Corporation, of the US, to provide for the exchange of technical knowledge and experience in matters relating to steel products and production, and to give both participants a preferential opportunity to make use under licence of certain patents and trade marks. "In the development of the strip mill and of the market for strip mill products, this agreement will be of great value," he says.

In Glasgow on Tuesday Sir Andrew said that in the matter of training staff to operate the new mill the company was receiving great help from all steelmakers in Britain and the Continent, but training was only part of the scheme. "There are some things we want to learn from the Republic Steel Corporation, such as rolling hard steels and stainless steels. They have also developed electro-galvanizing to a high state of perfection," he said.

The help to be received from the US company would enable Colvilles to forge ahead at Ravenscraig at a quicker rate than otherwise would have been possible. Republic Steel, he added, were interested in some of Colvilles' products, and towards the end of February a joint meeting will be held in Glasgow "to explore the possibilities." About 20 members of Colvilles' staff, ranging from mill managers to shift foremen, are to be sent to the US for training. The first seven left on Wednesday.

Discounting the present recession in the motor car industry Sir Andrew emphasized the importance of diversification and said there were some new uses of strip steel they had in mind, although he did not envisage at the moment Colvilles embarking on the development of tinplating.

MR. DAVID JOHN REES, secretary of the Merthyr Vale Lodge of the National Union of Mineworkers for the past 19 years, has retired.

Orders Placed

Davy & United to Build Swiss Aluminium Mill

REVERSING hot breaking-down and finishing mill is to be built by Davy & United Engineering Company, Limited, Sheffield, at the works at Chippis, Switzerland, of AIAG (Aluminium-Industrie-AG). Davy & United is a member of the Davy-Ashmore, Limited, group. The contract is worth over £500,000.

The new mill will be capable of producing aluminium plate up to 7 ft. 6 in. wide and down to ¼-in. minimum thickness.

ENGINEERING DIVISION of the Telegraph Construction & Maintenance Company, Limited, (Telcon), a member of the British Insulated Callender's Cables, Limited, group, has received a contract from Wartsila-Koncernen A/B, Helsinki, Finland, for all the cable-handling equipment for two new cableships being built for the USSR.

ORDER WORTH £200,000 for 240 distribution transformers of 500 kVA. capacity has been placed with Associated Electrical Industries, Limited, by the London Electricity Board. AEI is also to supply the Central Electricity Generating Board with high voltage tap changers for voltage regulation on the Monk Fryston and High Marnham power line.

Alternative Powered Steel Mill Crane

SEVEN-TON diesel-electric travelling crane is to be made by Thomas Smith & Sons (Rodley), Limited, Rodley, Leeds, for Stewarts and Lloyds, Limited. The crane is primarily required for use inside mill buildings for the clearing of scale pits, and when employed on such duty will be static.

To obviate difficulties caused by diesel fumes if the diesel engines were to be in operation in an enclosed area, the crane is being equipped to be operated directly from the mains electricity supply, and the diesel drive will only be employed when greater mobility is required on duties outside the building.

Two Smith M.E.I truck cranes with a lifting capacity of 22½ tons have been ordered by Dorman Long (Bridge & Engineering), Limited. The cranes will be used for the first year on the construction of the Thelwall viaduct and Martinscroft bridges (Lancs).

Cut in UK Shipbuilding Foreseen

DISAPPEARANCE of one third of Britain's shipbuilding capacity was forecast by Mr. Andrew H. S. Lewis, managing director of John Lewis & Sons, Limited, shipbuilders and engineers, of Aberdeen, speaking to Aberdeen Rotary Club on Tuesday. In his opinion this might take place in various ways. Firms might cut prices until they cut each other's throats, and there might be amalgamations and takeovers. There might be some form of Government action so that there was an orderly reduction in capacity, but he had not yet heard of any.

He believed that shipyards could benefit by diversifying their activities. His own firm had interests in 16 industries or trades.

MR. ALFRED ROBENS

MR. ALFRED ROBENS

MR. ALFRED ROBENS, who was appointed chairman-designate of the National Coal Board last June, took over the chairmanship from Sir James Bowman at the beginning of this month, Sir James's term of office having expired on January 31. Since October 1, Mr. Robens, who is 50, has been a deputy chairman of the board.

Educated at a council school, Mr. Robens became an official of the Union of Distributive and Allied Workers in 1935. From 1942-45 he served as a Manchester city councillor. He was Labour Member of Parliament for the Wansbeck Division of Northumberland from 1945-50, and from the 1950 redistribution until he took up his NCB appointment in October last year he was MP for Blyth. From 1945-47 Mr. Robens was Parliamentary Private Secretary to the Ministry of Transport, and for the next four years filled the office of Parliamentary Secretary to the Ministry of Fuel and Power. From April to October, 1951, he was Minister of Labour and National Service, and was created a Privy Counsellor that year on joining the Cabinet. As a member of the Opposition he was Labour's spokesman in the House of Commons on industrial matters.

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BISRA STEELMAKING CONFERENCE

OPERATIONAL EXPERIENCES WITH THE MAERZ-BOELENS OPEN-HEARTH FURNACE

at the Dortmund-Hörder Hüttenunion A.G.

by VON CASPAR HEINRICH POTTGIEBER, HANS-JÜRGEN DÄRMANN, and EGBERT KNACKSTEDT, Dortmund

This paper was presented by Dr. Hans-Jürgen Därmann at the 54th British Iron and Steel Research Association Steelmaking Conference at Harrogate on May 11 and 12, 1960. It has also been published in German, in Stahl und Eisen, 80 (1960), pp. 1487-1492.

IN the year 1955 in the Dortmund works of the Dortmund-Hörder Hüttenunion A.G. it was decided to replace a tilting furnace built in 1911 by a modern fixed open-hearth furnace. When planning this, the idea came to build, in the first instance, a 150-ton furnace in accordance with the new Maerz-Boelens furnace lines.

Until this time, this profile had been tried only on a small 35-ton furnace, rebuilt at Grivegnée, near Liège. The 150-ton furnace was erected between February and April, 1956, and has been in operation since May, 1956.

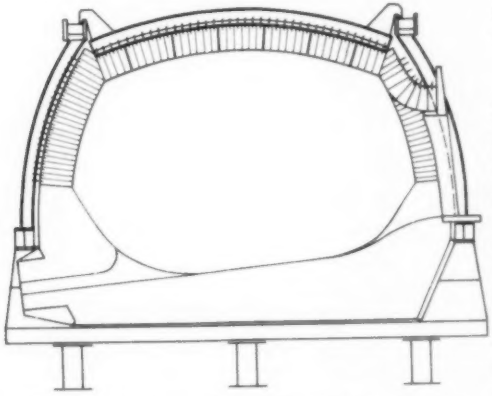


FIG. 1.—CROSS-SECTION OF MAERZ-BOELENS FURNACE.

Fig. 1 shows the cross-section through the Maerz-Boelens furnace. The narrow furnace chamber offers far-reaching technical advantages against the more usual wide furnace chamber. Because of the radial layout of roof, frontwall, and backwall, the heat is radiated back to the bath better than before. Dead spaces where turbulences can develop are avoided and by the reduction to 6/10 of a normal roof, very good figures regarding durability have been reached in Grivegnée. In particular, a reduction in consumption of refractories has been achieved.

Description of the Furnace Layout

Fig. 2 shows the furnace, which stands in a bay 27 m. long. The furnace is coke-oven gas/oil-fired and the air uptakes are now positioned closer to the furnace chamber. Hearth length is 13.8 m. and a hearth area about 65.6 m.^{2} (705 sq. ft.). It has five large charging doors.

For the Maerz-Boelens construction a special arrangement of upper furnace steelwork has been developed. Fig. 3 shows the backwall construction.

The bent supporting section of the front- and backwall are held together at the top end by a strong framework of broad flange beams (Fig. 4). The suspended roof is hooked in segments into this frame. It is freely accessible from the top because the transverse supports of the usual furnace steelwork can be dispensed with.

The single sections of the suspended roof can be changed by means of a crane. So far, it is not possible to take advantage of this feature at the Dortmund works because the auxiliary hoist of the charging crane is not satisfactory. The suspended roof consists of chemically bonded, steel-cased chrome-magnesite refractories with a pressed-in suspension eye.

The furnace has been constructed with a single uptake, in the end wall of which is a combined coke-oven gas/oil burner in a water-cooled housing.

Fig. 5 shows the inner view of the furnace hearth before bringing in the Crespie hearth. One can see the greatly overhanging arched walls and the roof arch. Fig. 6 shows a door pillar from the outside. Only that part of the refractory of the walls in contact with the suspension steelwork is fixed directly by hooks; the other part is fixed indirectly. The backwall of the furnace has the same construction. More supporting plates are fixed into the walls, which permit the lower part to be exchanged independently of the remaining upper part. For the lining of the furnace chamber brickwork above the foreplate only steel-cased refractories in chrome-magnesite with and without ferro-clip have been used.

The thickness of the refractories of the front-wall and the backwall is 500 mm. (20 in.).

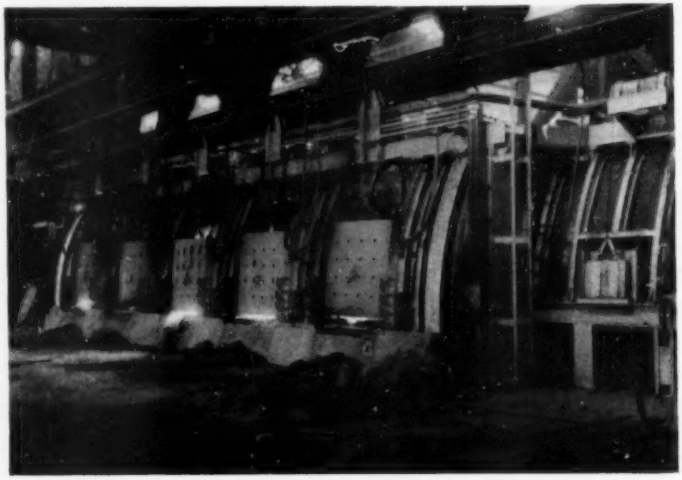


FIG. 2.—FRONT VIEW OF 150-TON MAERZ-BOELENS FURNACE.

In this way, and with this method of construction the upper furnace has for the first time been built in ferro-clip suspended refractories. The air uptakes and the roofs of the slag chambers have been constructed in the already known manner as suspended construction with ferro clip refractories, as can be seen in Fig. 7.

The slag chamber suspended roof develops into a flat checker chamber suspended roof made from high alumina fireclay refractories. The checker chambers of about 200 m.^{3} (7,060 cu. ft.) volume per furnace end, consist in the upper parts of fireclay refractories of 50 per cent. Al_2O_3 content which decreases towards the lower part in quality, down to 38 per cent. Al_2O_3 for the lower positions. The reversing of the furnace is done by a Blaw-Knox double-deck damper system within a maximum time of 12 sec.

The new furnace has been connected with the existing bricked 60-m. (200-ft.) chimney of the old tilting furnace, the draught of which has been reinforced by the insertion of a radial suction fan, supplied by Seiferth-Krüger. The firing of the furnace is done by a combined coke-oven gas/oil burner: the oil burner is of the Brinkmann type and can be regulated between 500 and 2,800 kg./hr. (115 to 650 gal./hr.). The furnace can also be operated with oil alone. The coke-oven gas is compressed to a pressure of 0.20

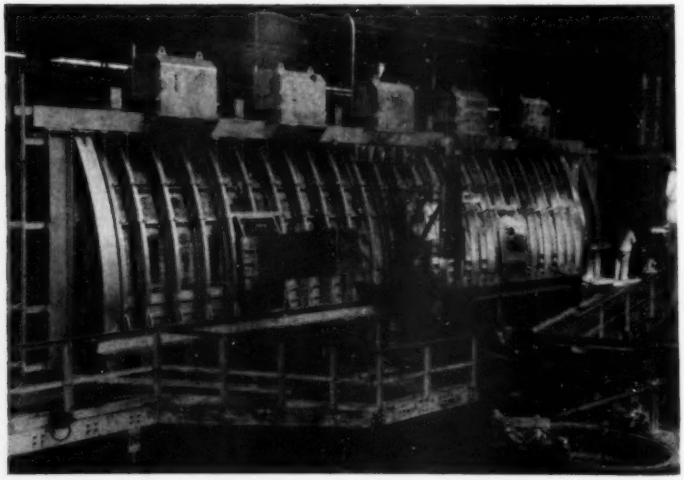


FIG. 3.—BACK VIEW OF MAERZ-BOELENS FURNACE.

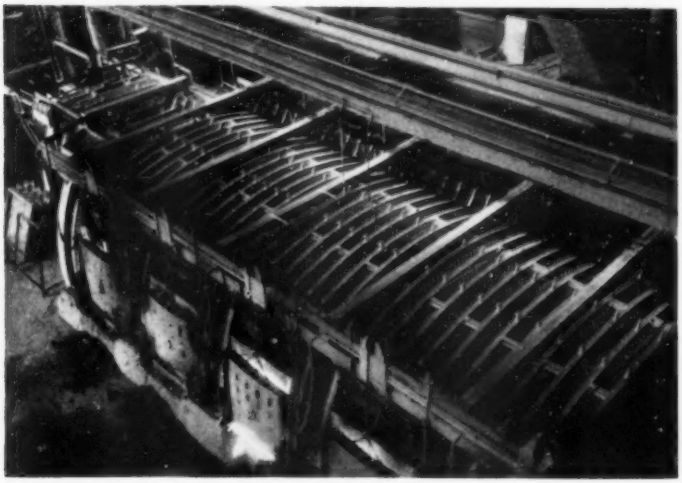


FIG. 4.—ROOF OF MAERZ-BOELENS FURNACE.

atm. The atomization of the fuel oil, which at present has an average S content of 2.35 per cent., is by compressed air to 6 atm. The oil is preheated to 120 deg. C.

On the tapping side, the available crane installation is not capable of tapping 150 tons into one ladle. The new stationary furnace, therefore, had to be provided with a double spout.

It must be admitted that the introduction of this completely new furnace type was not always without handicaps. All difficulties, however, were overcome with the complete co-operation of Maerz. The reduction of the furnace profile had the inevitable consequence that the frontwall as well as the backwall is exposed to a greater wear. It is especially for this reason that with an inward sloping backwall the possibilites of repair by throwing dolomite are not the same as with a furnace of normal construction.

Fig. 8 shows the wear sketch of the furnace after its first campaign. It shows that the furnace had become even more oval in shape than when constructed. In course of time, the wear of the backwall could be diminished by increasing the inclination of the backwall inwards. Today the angle of inclination is 22 deg. In this way, the flame is kept more on the bath and it is now practically impossible for it to spread and ascend up the backwall.

A further early difficulty was a relatively poor life of the corner pillars, because these are also sloping inwards. However, by supplying cooling pipes this could be corrected. With future furnace construction, consideration is being given to dispensing completely with pillars and to constructing the front- and backwalls from the face of the port end sloping up to the furnace. The construction of such a furnace, without pillars, would be considerably more simple. Only two refractory sizes in two different lengths each would be required for the total arched part of the upper furnace, because in any case, for a new construction all the refractories would be suspended.

It was shown that towards the end of each furnace campaign the intermediate wedge shaped bricks of the backwall are exposed to a considerably greater wear than the surrounding suspended refractories. Also, with refractory material becoming thinner, it occurred frequently that the intermediate bricks were pushed out. We have endeavoured to explain this, which we suppose might be caused by thermal stresses or the like. The idea of charging the furnace through four special doors only for a period proved that the non-suspended refractories were pushed out during the charging by occasional colliding of scrap.

It was found that the backwall of the closed door remained unaltered over several weeks. In view of these facts, it was decided at the next repair to suspend the backwall completely, because

FIG. 5.—HEARTH SPACE BEFORE LAYING THE HEARTH.

FIG. 6.—DOOR PILLARS.

the suspended refractories are only very seldom damaged. The method of suspension is such that the refractory is suspended as well as supported towards the outside (Fig. 9).

An astonishing improvement in durability and output was reached by altering the angle of the burners which had been positioned when first erecting the furnace at an angle of 12 deg. to the horizontal. After the burner had been brought to the greatest possible slope of 18 deg., the furnace output increased and the roof wear decreased. The heat consumption was very favourable from the start. Here the smaller furnace space and the reduced radiation through the smaller surface of the upper furnace really came into effect.

In order to be able to say something definite on the economy of such a furnace in relation to its heat consumption, radiation measurements on the upper furnace should be taken. It is quite possible that the reduced loss of heat because of the smaller surface of the furnace is neutralized by greater heat radiation which is caused by the thinner frontwall and backwall. Also, it cannot be denied that a certain economical optimum exists between heat consumption and output. This problem has been subjected to scientific investigation. The heat radiation has been calculated from temperature measurements at 18 different points on the roof by inserted thermocouples. A few significant results were obtained.

Normally, one expects today for the heat input of a furnace per sq. m. hearth area a quantity of 0.4×10^6 kcal/h. (1.5 therms/hr./sq. ft.). Fig. 10 shows the heat radiation of the furnace at such a heat input and at a furnace life of 350 heats. It will be seen that the furnace begins to radiate heat to a greater degree during charging and that the radiation during the melting process tends towards a minimum. The checker chamber temperatures also increase steeply during charging.

On observing those facts for some time, we determined the surplus heat in the upper furnace and checker chambers during the charging time with about 20×10^6 kcal/h. (800 therms/hr.) and then reduced the heat input (Fig. 11). One part of the heat, of course, had to be added again during the melting time, because the furnace was now working with a somewhat lower air preheat from the checkers. It has been shown without any doubt that the furnace with a lower total heat input had the same output after this arrangement.

It is clear that the greater radiation from the upper part of the furnace during the charging can also be avoided by increasing the speed of charging —especially of light scrap. This procedure must be noticeable mostly in the melting period. Unfortunately, it is still not possible in Dortmund to charge at the same time with two machines. According to our calculations this would mean an

FIG. 7.—AIR UPTAKE.

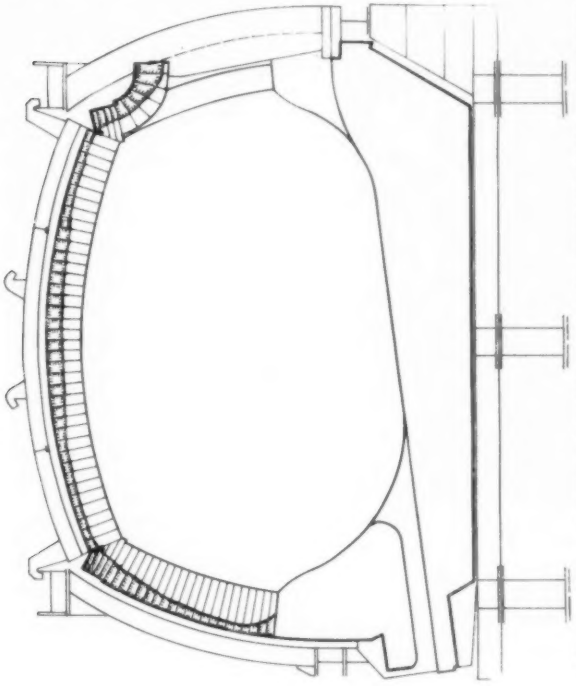


FIG. 8.—WEAR CONTOUR (SHADED AREA) OF FURNACE WALLS AND ROOF AFTER FIRST CAMPAIGN OF 733 HEATS.

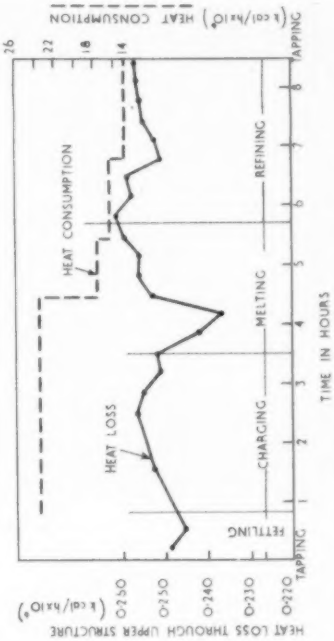


FIG. 10.—HEAT RADIATION FROM FURNACE DURING A CHARGE.

increase in the output rate of 1 ton/hr. Today the charging rate is 53 ton/hr.

When drawing up a heat time table, it is important that with increasing age of roof, frontwall, and backwall, *i.e.*, with decreasing refractory thickness, to increase gradually the heat input to the furnace, in order to compensate for the increase in radiation because of the thinning brickwork.

An excellent feature of the Maerz-Boelens furnace is the considerably reduced time for repair of the furnace. The maximum time for bricklaying, according to our experience, for the upper furnace, is not more than nine to 10 shifts of 8 hr. Normally with the lower furnace repair time, including cooling and demolition, of seven shifts and a

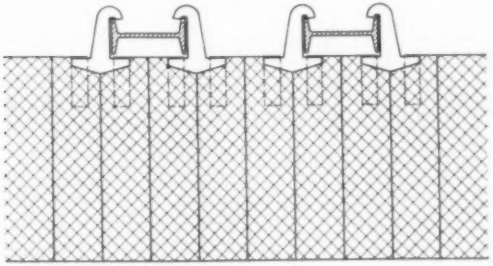


FIG. 9.—METHOD OF FIXING BACKWALL REFRACTORIES.

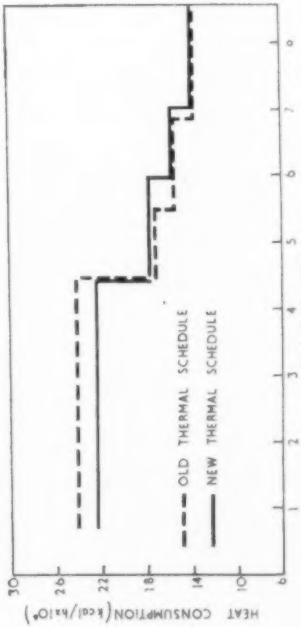


FIG. 11.—THERMAL SCHEDULE OF 150-TON O-H FURNACE.

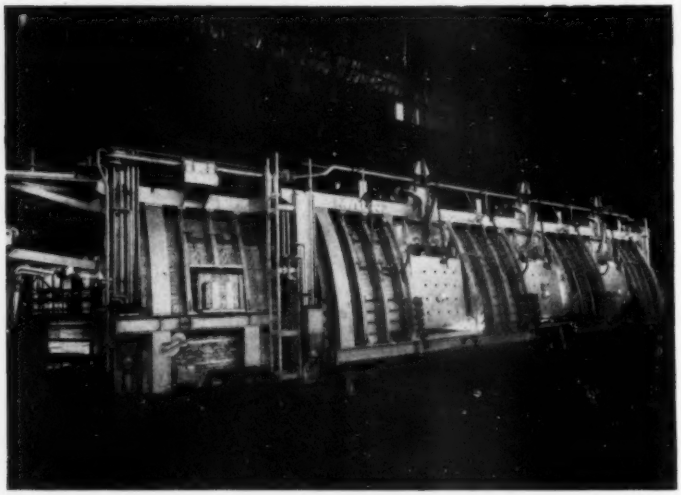


FIG. 12.—100-TON MAERZ-BOELENS FURNACE.

heating-up time of 10 shifts, that is, 80 hr., the furnace needs nine days from the last tapping to the first charging into the completely rebuilt furnace. The comparative repair time with the same number of men for our other four 150-ton furnaces is 16 days.

It is, perhaps, of interest to give a few output figures from the recent operation of the furnace. The furnace had a roof life of 672 heats with an output of 104,000 ingot tons, and a production rate of 19.35 ton/hr. when charging 28 per cent. molten metal. This figure includes all repair times and times of disturbances up to 4 hr. The average weight tapped is 160 ton liquid steel.

It was unfavourable for the furnace that during the time covered in this report the OH shop was working only 18 shifts per week. The heat consumption over the production period equals 0.87×10^6 kcal/t (34.5 therms/ton) and total including weekend shut down 0.97×10^6 kcal/t (38.5 therms/ton) calculated for the furnace output for the average of all melting processes.

The current campaign has now made 401 heats, and a total of 63,000 tons, at a production rate of 20.3 ton/hr. and a fuel consumption of 0.84×10^6 kcal/t (33.5 therms/ton).

After 401 heats the frontwall and backwall of the furnace were repaired and steelmaking commenced again after eight days, with the same roof.

Maerz-Boelens Furnace at Hörde Works

On the basis of experience with the Maerz-Boelens furnace in Dortmund, a Maerz-Boelens furnace for tapping weight of 100 ton (Fig. 12) was erected in 1957 in the associate works Hörde as substitute for a 70-ton gas fired furnace in a 26-m. (86-ft.) bay of the OH shop No. II. The furnace had a total hearth area of 52 m.^{2} (560 sq. ft.) and checker volume of 165 m.^{3} (5,840 cu. ft.) per furnace side. In its essential constructional features it is the same as the furnace in Dortmund, except, however, in so far as experience gained in the meantime could be applied to the furnace in Hörde. As a special advantage, it should be mentioned that the crane conditions permit there the lifting of the roof segments, so that repairs and lining can be carried out in shorter time (Fig. 13).

Because of the arrangement with only three doors, relatively wide frontwall pillars were erected, which were very accessible and showed especially good durability. No difficulties were encountered with the hearth in spite of the wide pillars.

On average, about 104 tons were tapped into one ladle, and a double spout was unnecessary. The heating of the furnace was done by oil and coke-oven gas. The coke-oven gas is supplied to

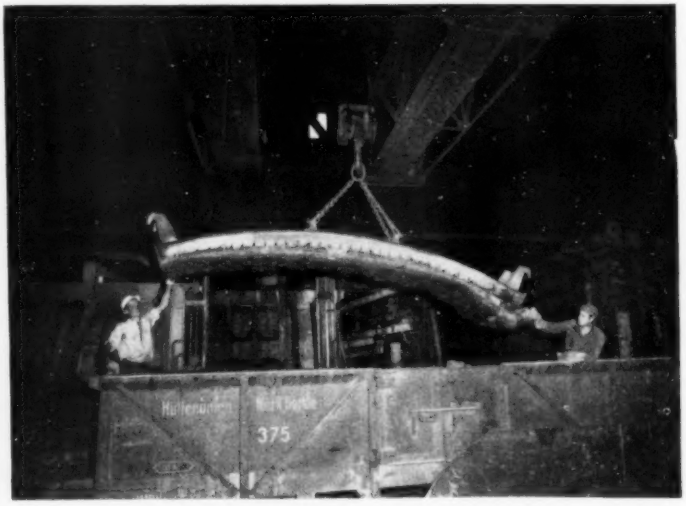


FIG. 13.—LIFTING OF A WORN ROOF SEGMENT.

the burner as in Dortmund with a pressure of 0.2 atmospheres (Fig. 14).

The capacity of the burner was arranged for a fuel quantity corresponding to 450,000 kcal/m.² hearth area per hour (1.7 therms/sq. ft./hr.) with straight oil firing also being possible. The angle of the burner can be adjusted by remote control and it can be inserted and withdrawn different distances. When reversing, the burner on the outgoing end is withdrawn from the furnace. The position of the flame can be adjusted to the prevailing conditions during melting and refining.

This equipment has been very satisfactory in every respect. The length of the oil flame can be regulated, as in Dortmund, to the desired length, by regulating the secondary air quantity with the help of push-button control from the melter's control position.

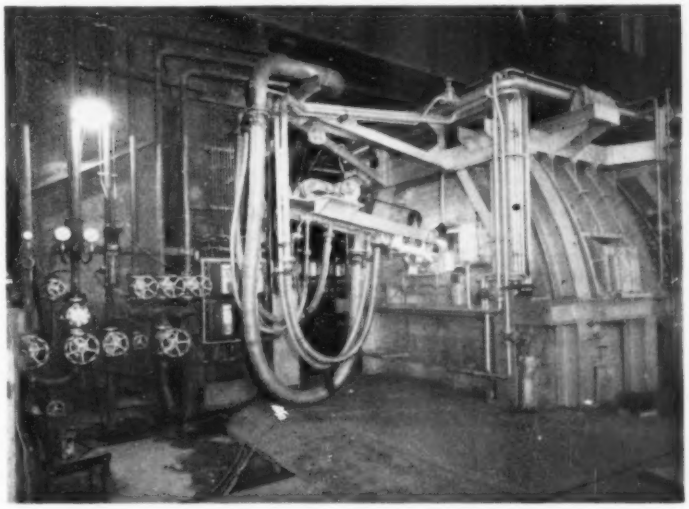


FIG. 14.—GAS/OIL BURNER.

For the reduction of heat loss, the furnace was equipped with steam-cooled door frames by the Reining system with natural circulation, which was connected to a waste-heat boiler. The hourly production of the door frames is about 2 tons of steam at about 15 atm. The waste-heat boiler by Oschatz produces hourly about 6 tons of steam.

The performance of the first two campaigns of this furnace was as follows:—1st campaign, 733 melts, giving 77,000 tons; 2nd campaign, 1,101 melts, giving 115,000 tons.

Excluding from the total charges for the purpose of a true comparison, all heats which have been duplexed and those which used oxygen, which altogether represent only a small number, an output for the first campaign of 15.9 ton/hr. (tap to tap) and a fuel consumption of 1.06×10^6 kcal/ton (42 therms/ton) was obtained, and it must be added that in Dortmund and also in Hörde the melting shop does not work a continuous week. At the second campaign, the furnace reached an output of 17 ton/hr. at a consumption of 0.95×10^6 kcal/ton (38 therms/ton). This improvement can be traced among other reasons to the increase of the charge rate from 31.5 ton/hr. to 36.9 ton/hr. In both campaigns the percentage of molten metal charged represented about 20 per cent. of the total charge.

Conclusions

In conclusion, it can be stated that, according to the experiences of both works of the Dortmund-Hörder Hüttenunion, the new Maerz-Boelens design was successful. Initial difficulties were surmountable. Valuable knowledge was gained with the help of which a considered new construction could be simpler and still more economic.

It must, however, be borne in mind that an all-basic open-hearth furnace with such small inside dimensions required continuous, careful supervision, especially of the heat input, the gas and air regulation, and so on. The most important feature is the low heat consumption and the ease with which quick repairs can be made. Furnace availability figures of more than 95 per cent. are obtainable without difficulty.

THREE STEEL PLANTS FOR PAKISTAN

THREE steel plants are planned to be set up in Pakistan. One, at Karachi at an estimated cost of Rs. 200,000,000 and with an annual capacity of 250,000 tons, will be based on local scrap and imported pig-iron or imported iron ore. A second plant, to be located at Chittagong, in East Pakistan, will have a capacity of 100,000 tons. It is estimated to cost about Rs. 100,000,000. The necessary survey for the establishment of this plant has already been carried out by foreign experts. Capacity of the third plant will be 10,000 tons; it is to be set up at Kalabah, in West Pakistan.

Total provision for the country's steel production is Rs. 32,500,000,000, out of which the public sector is expected to provide up to Rs. 170,000,000.

APPOINTMENT IS ANNOUNCED of Geo. Angus & Company, Limited, 152/8, Westgate Road, Newcastle-upon-Tyne 1, as sole distributor in the UK, Eire, and certain oversea territories for the range of industrial safety harnesses and ancillary equipment manufactured by the G. Q. Parachute Company, Limited, Stadium Works, Portugal Road, Woking (Surrey). Distribution of car safety harness will continue to be handled by the manufacturers.

Prospecting Activities in Australia

THE inferred iron-ore deposits in the four occurrences of the Bungalbin-Walton (Western Australia) area in the Yilgarn field are 43,415,000 tons and the grades are about 60 per cent. iron. The deposits are north of those at Koolyanobbing and extend north from Boorabbin. It is reported that they do not contain any high percentage of detrimental elements. In addition, the iron-bearing jaspilite zone of the belt contains large tonnages of low-grade material carrying between 30 and 50 per cent. Fe.

At the Constance Range (Queensland) 100 miles south of the Gulf of Carpentaria, the Broken Hill Proprietary Company, Limited, has an iron-ore prospect with a very large quantity of iron-bearing material that warrants considerable expenditure on exploration. None of the ore so far found is, on present indications, of very high grade, but there may be quantities which can be shipped without benefaction.

It is believed that direct shipping ore so far prospected would have to be won by underground mining.

There are prospects of greater activity in tin mining in North Queensland. For some years the Mount Garnet district has been the chief centre of production from the two bucket dredges, supplemented by some production on the Herberton field, and the Cooktown district. Clutha Development, Limited, has recently taken over the Gilmore tin mine, on the Mount Garnet line, and development is proceeding. It is stated that other companies are engaged in the investigation of tin occurrences.

Search for copper and other minerals in the Wallaroo-Moonta-Kadina locality (South Australia) is to be continued, and Government approval has been given for a short-term special mining lease to Gold Mines of Australia, Limited. Since the war, the State Government has spent £60,000 in the unsuccessful search for new copper lodes in the district. It is considered that undiscovered lodes could be hidden under featureless overburden of soil and limestone.

The Commonwealth Scientific and Industrial Research Organization has assisted in the exploration of extensive newly discovered oolitic iron formations of the Northern Territory. Microscopical examination of outcrop specimens, and of selected sections of drill cores from these occurrences, has revealed their texture and mineral composition. This led to the prediction that in the deeper-lying sections of the formation, carbonate minerals would take the place of the silica cements found in surface and near surface sections. Subsequent drilling has confirmed this, the carbonate proving to be the iron carbonate, siderite. In the Roper Bar area the first occurrence in Australia of the iron silicate greenalite, was found, permitting a new chemical analysis and giving new X-ray powder data for this mineral. The oolitic siderite formations of the Constance Range promise a significant addition to Australia's iron-ore reserves.

KOI-HAIS REUNION AT NACM CONFERENCE

IT is proposed to hold a Koi-Hais reunion in connection with the annual conference of the National Association of Colliery Managers to be held at Edinburgh in June. As usual, it will be held on the eve of the opening of the conference, June 5.

All members of the association and other friends who have been associated with India —past and present—and who wish to attend the reunion are invited to obtain particulars from Mr. J. R. Prentice, Becorit (G.B.), Limited, 42, Frederick Street, Edinburgh 2.

Story of the Internal Combustion Engine

EVOLUTION of the internal combustion engine will be the theme of the display by Shell-Mex & BP, Limited, at the Engineering, Marine, Welding, and Nuclear Energy Exhibition at Olympia, London, from April 20 to May 4. This theme has been adopted to mark the centenary of the conception by Otto, in 1861, of the four-stroke cycle principle and to show the evolution of the engine through the ensuing 100 years. It will be introduced with a portrait of the Dutchman, Huygens, who, in the 17th century, built what was probably the first internal combustion engine and which is of interest because it was actuated by the explosion of a charge of gunpowder.

The theme will be developed in a mural with two sets of panels, the first set showing portraits of Lenoir, Otto, Robson, Akroyd Stuart, Diesel, and Büchi.

These men discovered and successfully applied the principles which are the basis of the modern compression ignition engine and the panels will contain extracts from the original patents dealing with their inventions and illustrations of the engines they built. The second section of panels will show some of the applications of modern compression ignition engines in industry and transport by sea, road, and rail, the set being illuminated and arranged to revolve.

ADDITIONAL EQUIPMENT to increase iron-ore production at the Iron Baron deposit is to be obtained by the Broken Hill Proprietary Company, Limited. It is expected that production will be increased to 1,500,000 tons annually.

ANTHRACITE MINING IN SOUTH WALES

Reorganization of Brynlliw Colliery

Formally opened by Sir James Bowman, then chairman of the National Coal Board, on February 12, 1960, Brynlliw Colliery is one of the major projects of reorganization and development in the South-Western Division. The colliery has been re-equipped at a cost of between £700,000 and £800,000 and is regarded as one of the best reorganization projects carried out in South Wales. In choosing the level of the main roadways to provide access to the reserves, advantage was taken of faulting in the centre of the "take" which elevates the seams, more or less regaining the height lost due to the gradient of the seams.

MINING operations first began at Brynlliw Colliery, which is in No. 1 (Swansea) Area, South-Western Divisional Coal Board, in 1908, when two shafts, 13 ft. 6 in. dia., were sunk to the Swansea Four Feet Seam at a depth of 340 yd. Output was obtained from the Swansea Four and Five Feet seams until 1925, and in 1927 the colliery was abandoned.

When a site was being sought for the construction of a new colliery to work the remaining reserves in the locality, the site occupied by the old colliery had several features to commend it; the two old shafts were conveniently situated to afford access to the reserves and their use in the proposed project would effect considerable saving in expenditure.

Although the surface had become derelict after years of disuse, the topography was ideally suited for the construction of new surface arrangements and rail access could be obtained quite conveniently. After some consideration it was therefore decided to site the project at Brynlliw Colliery; in 1956 temporary headgears and winders were erected in readiness for deepening the shafts and driving underground roadways. The finalized scheme for the complete reconstruction was approved by the National Coal Board in 1957.

Distribution of the Reserves

The plan of the Swansea Six Feet Seam (Fig. 1) shows the area to be worked and the general geological features. The "take" available measure approximately six miles from the Bryn Serfyll fault in the west to the Tirdonkin fault in the east and up to two and a half miles from the northern to the southern boundary. This area is far more extensive than the "take" of the old colliery, which was limited to the area between the Bryn Gwyn and Grovesend faults. The seam contours show a synclinal structure running through the "take" from east to west, this feature being more clearly defined in the eastern part of the area than the west.

A series of faults intersect the "take" from north to south and divide it into five main areas, which are lettered A to E in Fig. 1. The effect of the faults is shown in the east-west section shown at the bottom of Fig. 1. The seams dip at an average gradient of 1 in 6 in a westerly direction over the length of the section and in the vicinity of the shafts are lowered into a trough formed by two faults of opposing throws. West of this trough faulting further faults elevate the seams and the height lost due to gradient is more or less regained. This feature has been used in the general layout, as will be seen later.

The area contains four workable seams, which, in descending order consist of the Swansea Four Feet, Five Feet, Six Feet, and Three Feet seams. These are separated by approximately 104, 140, and 23 yd., respectively, the Swansea Six and Three Feet seams being in close proximity to each other. All four seams are at present being worked at neighbouring collieries. The Four Feet has an overall section varying in thickness from 3 ft. to 5 ft., but frequently its dirt content amounts to as much as 50 per cent. The only colliery at which this seam is being worked is at Morlais.

The Five Feet Seam is worked at Graig Merthyr, Mountain, and Garngoch No. 3 collieries, and its section, which is comparatively free from dirt, varies in thickness from 3 ft. to 6 ft. The Three Feet Seam has a fairly uniform thickness in the region of 2 ft. 3 in. and is being worked at Graig Merthyr and Garngoch No. 3 collieries. The distribution of reserves in millions of tons between seams and areas is shown in Table 1, the lettered areas indicating those shown in Fig. 1.

TABLE 1.—*Distribution of Reserves (in Million Tons) at Brynlliw Colliery.*

Seam	Area A	Area B	Area C	Area D	Area E	Total.
Four Feet	—	—	—	1.7	—	1.7
Five Feet	3.4	—	—	2.5	—	5.9
Six Feet	6.6	5.1	3.6	—	4.7	20.0
Three Feet	4.5	3.4	2.4	—	2.4	12.7
	14.5	8.5	6.0	4.2	7.1	40.3

FIG. 1.—PLAN AND SECTION OF THE AREA TO BE WORKED AT BRYNLLIW COLLIERY, SHOWING THE MAIN GEOLOGICAL FEATURES.

The Six Feet and Three Feet seams are available in every area except D (Fig. 1) and contain 76 per cent. of the total reserves. At the designed output of 2,000 saleable tons per day, the total reserves of 40,300,000 tons represents a life for Brynlliw Colliery of approximately 80 years.

Size of Project

Originally it was intended for the new colliery to be designed for an output of 3,600 saleable tons per day and Morlais Colliery, which had become inefficient and short of reserves in current working areas, was to be closed. The reserves then to be worked from Brynlliw Colliery also included 5,800,000 tons in the Five Feet Seam in Area C, making a total of 46,100,000 tons. A scheme prepared for the larger unit provided for horizon mining with an extensive arrangement of locomotive roadways to all parts of the "take," and a new shaft of larger diameter than those in existence to deal with the required output.

The cost of this scheme was found to be excessive and efforts were directed to the preparation of a cheaper alternative. It was then decided to reduce the output at Brynlliw to that which could be dealt with from the existing shaft, which from winding and ventilation calculations was established at 2,000 saleable tons per day on a two-shift basis.

It was also decided to adopt an underground layout designed on more conventional lines and to retain the Morlais Colliery as a producing unit by allocating to it the Five Feet reserves in Area C, access to these reserves being considered easier from Morlais Colliery than from the new layout adopted for Brynlliw. This arrangement saved the cost of the new shaft previously proposed and use is made of the existing assets at Morlais Colliery, although some expenditure has to be incurred at this colliery to improve productivity. The output from the two collieries will only be slightly less than that proposed for the larger project. However, the saving in expenditure is considerable.

Underground Layout

The seams containing the reserves available to the project are represented in the section shown in solid lines in Fig. 1. The vertical distribution of these seams is such that it has been possible to establish one horizon on which to drive locomotive roadways to gain access to the reserves in every area of the "take." The level of this horizon has made it possible to deepen the shafts only that amount required to allow the new pit-bottom roadways to be formed in new ground clear of the roadways in the old pit bottom. No. 1 shaft was deepened 25 yd. and the No. 2 shaft 43 yd., the greater amount of deepening being required in No. 2 shaft for skipwinding arrangements.

In the eastern half of the area to be worked, two parallel roadways, one intake and the other return, have been provided. The intake roadway has been driven at a locomotive gradient of 1 in 200 beyond the intersection of the seams and will continue at the same gradient to its full extent. The return roadway has been driven at the same gradient to the intersection of the seams and thereafter follows one of the seams rising above the parallel locomotive roadway. East of this intersection it is proposed to work the seams from either inclined drifts or staple shafts connecting the two roadways.

On the western side of the "take" a single roadway has been driven at a locomotive gradient of 1 in 200 to the vicinity of the Gwili fault. From this point an inclined drift has been driven to connect with an existing roadway at Morlais Colliery. This roadway leads to an inclined drift to the surface and forms the main return airway and second means of egress for the western workings at Brynlliw. Beyond the Gwili fault two roadways, one intake and one return, will be driven to gain access to the areas further west.

All locomotive roads are driven at a gradient of 1 in 200, which, being steeper than is usually the custom, was considered necessary for the adequate drainage of water to the pit bottom. It has been found that the gradient does not substantially effect the hauling capacity of the locomotives or the braking distances.

In roadways already driven at this gradient the tracks are reasonably dry even though the gutters along them carry substantial quantities of water. All roadways extending in the various areas from the locomotive roads will be driven in the seam.

Establishing Production

Major developments at Brynlliw Colliery for establishing the planned output are now almost complete and efforts are being made to develop the working districts. On the east side two districts are already in production, one on the northern side of the main roadways and the other on the south side. A further district to the north of the West Horizon, is also in the stages of development. The method of working in the two districts in operation is a mechanized shortwall system using Joy continuous miners and Joy 12 BU gathering-arm loaders. The continuous miners are used to develop the rooms or stalls followed by the use of the 12 BU loaders to work the panel sections. By this method the high productivity usually associated with mechanized pillar-and-stall workings is expected to be obtained.

Coal from the working faces is being conveyed by scraper chain to a belt conveyor installed in the entry roadway to each district. A loading point has been formed in the East locomotive roadway where the coal from the north and south districts is simultaneously loaded into 2-ton mine cars. A similar loading point is also to be constructed at the loading point on the West horizon.

At the loading point on the East horizon, designed by Hanmade Conveyor Company, Limited, Hucknall (Notts), special attention has been given to reducing degradation by limiting the free fall of coal into the mine cars. Arrangements have also been made, by fitting a combed-shaped flap at the bottom of the loading chute, to deposit a

FIG. 2.—PIT-BOTTOM LAYOUT FOR BOTH NO. 1 AND NO. 2 SHAFTS.

layer of fine coal into the bottom of the mine car to reduce breakage of the larger coal.

Coal from the loading points is transported to the pit bottom in trains of 20 to 25 cars by 8-ton battery locomotives supplied by Greenwood & Batley, Limited, Leeds.

Pit-bottom Layout

The pit-bottom layout, shown in Fig. 2, has been designed for winding mine cars containing dirt and materials in the No. 1 shaft and for winding coal in skips in the No. 2 shaft. The roadways on the west side of the shafts consist of a coal road which is offset from the No. 2 shaft, a dirt supplies road in line with No. 1 shaft, two water-storage roads, a pumphouse, and a substation.

On the east side of the shafts the roadways consist of a main return airway for the east side workings, a locomotive battery charging station (Fig. 3) connected to the return to comply with the Locomotive Regulations, and a roadway providing access to the Main East return. Six charging bays, four in continual use and two standbyes, are installed for battery charging.

The coal road contains two tracks, one for full cars and the other for empties. Coal trains are hauled to the entrance of the road where the locomotive is detached and the full cars move forward by a series of pushers. The cars are uncoupled, fed singly by gravity to the tippler, unloaded, fed again by gravity to a turntable and returned to the second track. The height lost by the gravity runs is regained by passing the cars over an elevating creeper, after which they are coupled into trains and moved back to the entrance of the roadway to be picked up by a locomotive.

The dirt and supplies road contains three tracks in a similar manner to that in the coal road, except that the cars are elevated by a creeper immediately on leaving the cage and are returned over a backshunt instead of a turntable.

The elevating creeper is placed in the track leading from the cage so that the track by-passing the shaft is kept clear of obstruction and can therefore be used by locomotives.

Water draining back to the pit bottom is directed into the two water-storage roads which dip to a level sufficiently below that of the pumphouse and other pit-bottom roadways. The two storage roads are connected to the pumphouse by a common snore chamber which makes it possible for one roadway to be emptied for cleaning while pumping continues from the other. Mine car access is provided to each roadway to facilitate cleaning.

No. 1 Shaft Winding Arrangements

No. 1 shaft is equipped with a balance weight and cage for winding dirt, materials, and men and is also used as a downcast shaft to ventilate all underground roadways.

The diameter of the shaft is only 13 ft. 6 in. and the application of the conventional two-cage arrangement would have necessitated using mine cars of a size considered to be too small for efficient underground transport.

A single large cage has therefore been used to allow the use of mine cars, which have been designed for a capacity of 82 cu. ft. or 2 tons of coal. This size is considered sufficiently large for efficient transport, but not too large to be used in seam roadways where in parts the gradients are likely to be in the region of 1 in 6. Fig. 4 shows a view of No. 1 shaft pit bottom.

To wind the number of men to be employed per shift in the customary manwinding period of half an hour, it has been necessary to install a double-deck cage, but for winding dirt and materials, single-deck winding provides adequate capacity. Platforms at the top and bottom of the shaft provide access to the top deck of the cage for manriding.

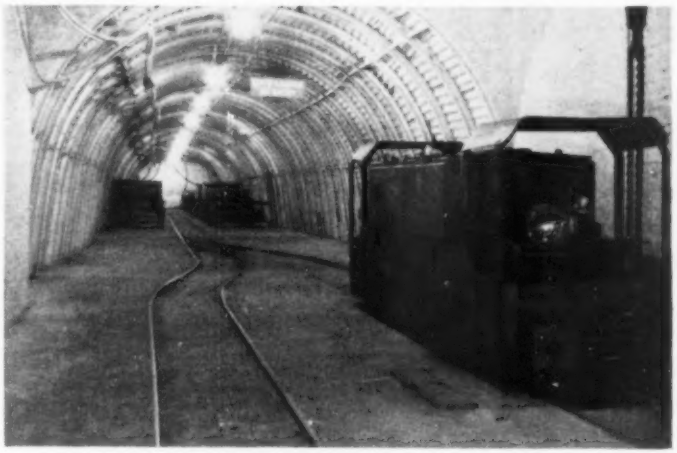


FIG. 3.—LOCOMOTIVE BATTERY-CHARGING STATION AT BRYNLLIW COLLIERY.

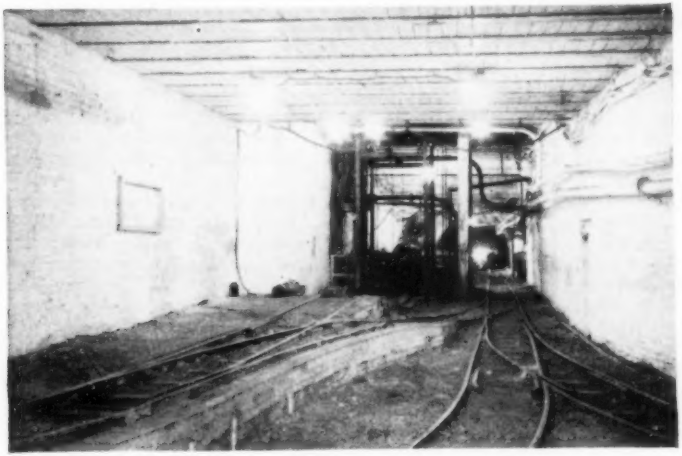


FIG. 4.—NO. 1 SHAFT PIT BOTTOM.

At the pit top, as can be seen from Fig. 5, the mine-car circuit is very compact and can be controlled entirely by the banksman. Full cars gravitate from the cage, turn on a turntable, and gravitate again to an elevating creeper, from which they pass to the tippler. Empty cars gravitate from the tippler to a second turntable and are also returned to the shaft in readiness for ramming into the cage.

From the tippler, dirt is conveyed to a bunker, where it is loaded into dumpers and transported to the disposal areas. The winder serving No. 1 shaft, supplied by Associated Electrical Industries (Manchester), Limited, has a parallel drum driven by a 1,500-h.p. a.c. motor and is capable of 36 winds per hour with a maximum rope speed of 42 ft./sec.

No. 2 Shaft Winding Arrangements

No. 2 shaft is equipped with two 4-ton skips which contain emergency manriding decks for 10 men. All the output is wound in this shaft, which is also used as an upcast for the east side of the pit.

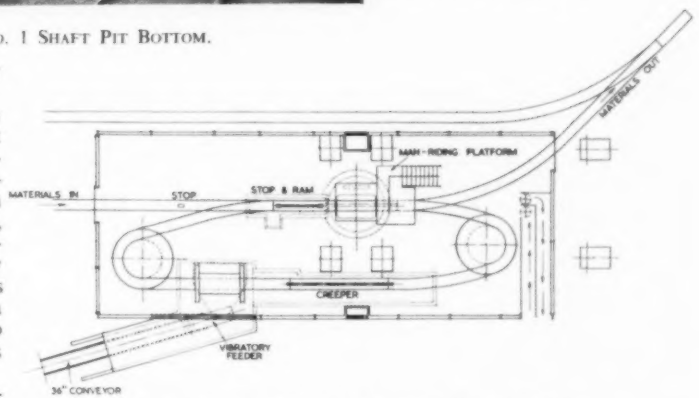


FIG. 5.—SURFACE MINE-CAR CIRCUIT FOR NO. 1 SHAFT.

FIG. 6.—ROTARY TIPPLER UNLOADING COAL TO BE SKIP WOUND AT NO. 2 SHAFT.

The planned saleable output of 2,000 tons per day represents a gross output in the region of 2,500 tons per day to be wound during the two coal-winding shifts. The adoption of skipwinding makes it possible to wind this output efficiently, irrespective of the small diameter shaft. A car-winding arrangement to provide the same capacity would require the use of multideck cages with a consequent reduction in winding efficiency.

The skips are installed in the No. 2 shaft, since it is the shaft nearest the siding and is therefore more conveniently situated for the installation of a surface conveyor to transport coal from the skip discharge point to the coal preparation plant. The skip shaft is also used as an upcast for the east side of the pit and the air velocity in this shaft is approximately half that in the downcast shaft, which carries all the air for both ventilating circuits.

The use of the upcast shaft for skipwinding therefore has the advantage that, due to the lower air velocities, dust produced when loading and unloading the skips has less tendency to become airborne. Furthermore, that which does become airborne passes up the shaft instead of being carried into the pit-bottom roadways. Another advantage of using the upcast shaft for skip-winding is that the airlock arrangements at the top and bottom of the shafts are far simpler than would have been possible if the upcast were used for car winding.

The equipment for transporting the coal in the No. 1 shaft, including the pit-bottom equipment with the exception of the turntables and pushers, was supplied by the Rhymney Engineering Company, Limited, Cardiff.

Full cars are fed singly to the front stops of the tippler loading ram. When the tippler is proved in position, the operation of a hand control lowers the tippler car stop and causes the ram to move forward, replacing the empty car by a full one within the tippler. Towards the end of the forward stroke of the ram, the tippler car stop returns to its original position, retaining the full car within the tippler. Meanwhile, the empty car gravitates to the turntable and then to the coupling point.

The RENCO tippler, shown in Fig. 6, is of the single-feed type, the body consisting of two rings spaced at a suitable distance apart to accommodate one 2-ton mine car. The tippler body rotates on split cast-steel rollers keyed to the steel shafts, one of which is an idling and the other a driving roller. The shaft revolves in cast-iron bearings with gunmetal strips. The tippler drive is through a roller chain, sprockets, and a worm reduction gear coupled to an electric motor. The control of the tippler is achieved by pneumatic gear, which starts and stops the tippler after completing a revolution. The complete tippler is mounted on steel section frames supported by concrete foundations.

Fig. 7 shows a section through the underground skipwinding plant. Coal, after being tipped, passes down the tippler chute to the plate feeder. At the discharge of the plate feeder the coal passes through a pneumatically operated diverting door to the appropriate loading bunker. When a bunker contains 4 tons the pneumatic circuits are brought into operation by a load-cell weighing device and the diverting door is operated to deflect coal into the other bunker. Should both bunkers become full electro-interlocking stops the plate feeder.

Each hopper is constructed of mild-steel plate suitably braced and stiffened with mild-steel sections. A pivoted pre-loaded type of anti-breakage plate is provided inside each hopper, which moves downwards under load and allows the coal to be lowered gradually to reduce degradation.

The outlet of each bunker door is fitted with a pneumatically operated guillotine door to contain the load. Each bunker is suspended from a steel section frame by the electronic load-cell connected to a special electronic relay unit housed in a flame-proof box. This flameproof electronic load-cell system is the first of its kind to be installed in Great Britain. The control unit embodies a potentiometer adjustment which is set to measure a 4-ton mineral load and operates the necessary pneumatic and electronic circuits when a hopper is full.

When a skip is proved in position, a pneumatically operated anti-spillage chute is brought into position and the hopper discharge door is

raised, discharging the 4-ton load into the skip. Each skip is of light alloy construction and is complete with body suspension members, an upper manriding platform, an anti-breakage plate, and a guillotine-type discharge door. Controls are provided for manual intervention to enable a partially filled skip to be wound away.

Fig. 8 shows the surface skipwinding arrangements. When the skip is proved in position for discharge the operation of a hand control on the banksman's control desk moves the anti-spillage chute and skip-door opening gear into contact with the skip. When the anti-spillage chute is proved in position, the operation of a further hand control raises the skip door, thus allowing the coal to discharge into the hopper. When the skip is empty, the skip door is closed and the anti-spillage chute and skip-door opening gear are withdrawn.

Situated on the opposite side of the shaft is the skip-changing chamber, which is fitted with doors on either end so that skips can be taken to or from the shaft without the air seal being broken.

The control cabin is positioned immediately above the skip discharge point and the emergency manriding level is some distance below. When winding men during an emergency, the manriding platforms of the skip are decked at the appropriate levels on the surface and underground.

The winder on this shaft is driven by an a.c. motor of 1,100 h.p. and has a parallel drum 11 ft. dia. With a maximum rope speed of 32 ft./sec., the winder has a capacity of 256 ton/hr.

Coal Preparation Plant

The coal preparation plant shown in Fig. 9, has a capacity of 250 ton/hr. and was designed and constructed by Unifloc, Limited, Swansea. The plant consists of a rotary breaker, which reduces the run-of-mine coal to minus 4 in. The minus $\frac{3}{16}$-in. to 0 fractions in the crushed product are extracted on Lecco-Vib vibrating screens, clothed with Duo-sieves and having a capacity of 70 ton/hr. The minus 4-in. to $\frac{3}{16}$-in. product from the Duo-sieves is passed on to a set of pre-wetting screens where the superfines are washed off the coal, these fines being passed into a clarifier for flocculation and settlement, after which the product from the clarifier is dewatered on a Unifloc rotary vacuum filter of the string discharge type.

The product from the pre-wet screen then passes into a D.M.S. heavy media unit, manufactured by Unifloc under licence from the Daniels Company, of Pennsylvania. This is the second D.M.S. unit to be built in this country, although there are large numbers of these units in operation in the US.

The clean coal product from the baths is separated on classifying screens into the following products:—Cobbles, French nuts, stove nuts, beans, peas, and grains.

The sinks from the first bath of the heavy media unit are passed into a second bath where the middlings are separated from the shale at a gravity of 1.8 s.g. The middlings are sold for power station use; the filter cake, the wet duff, and the dry duff are blended by a paddle mixer and the mixture is also sold to the Carmarthen Bay power station.

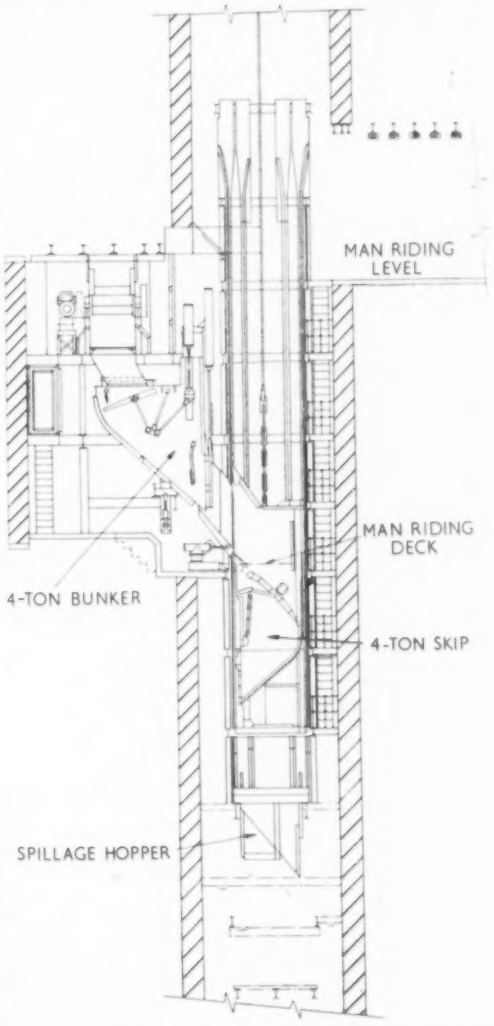


FIG. 7.—SECTION THROUGH UNDERGROUND SKIPWINDING PLANT AT NO. 2 SHAFT.

Magnetite is used in the heavy media circuit and after use the magnetite is recovered on two Stearns permanent magnet drum separators. The Stearns machine is one of the most successful magnetic separators yet devised and is manufactured under licence in this country by Unifloc.

A feature of the plant is the use of square tubes in the construction of all conveyor gantries

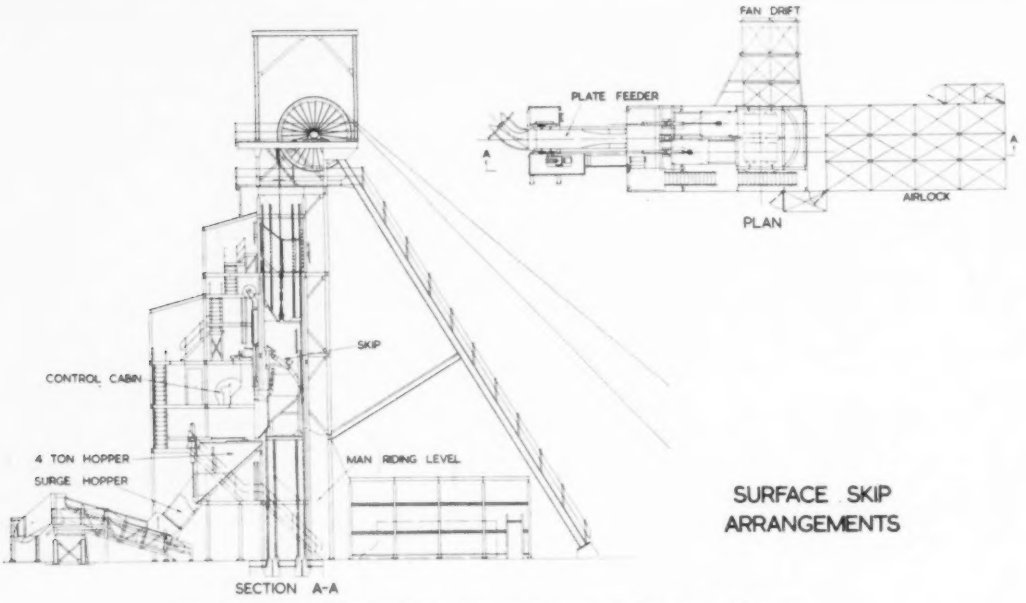


FIG. 8.—SURFACE SKIPWINDING ARRANGEMENTS AT BRYNLLIW COLLIERY.

and supports. It is understood that this is the first plant of this type where square tubes have been used on an extensive scale. The conveyors are to the design of Unifloc, the square tubes being supplied by Stewarts and Lloyds, Limited.

Coal from neighbouring collieries can be brought into the plant and tipped through a Rotaside tippler supplied by Strachan & Henshaw, Limited, and this coal is broken in the rotary breaker before being treated in the coal preparation plant.

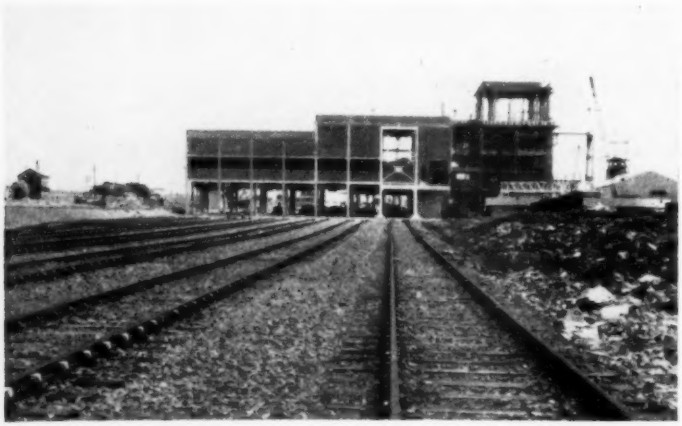


FIG. 9.—COAL PREPARATION PLANT IN THE FINAL STAGES OF CONSTRUCTION.

Ventilation

The colliery is at present being ventilated by an exhausting fan on the surface at the No. 2 shaft, but the underground connection with the Morlais slant has been established and the fan installed. The fan is expected to be started up shortly when the No. 1 shaft will be a common downcast for both the east and west circuits.

When the ventilating arrangements were being considered some thought was given to a forcing fan arrangement which appeared to be particularly suited to the general layout. This arrangement would have involved forcing air down the No. 1 shaft, through the workings in both sections of the mine, to return up the No. 2 shaft and the Morlais slant. The air would flow in the same direction as the existing circuit except that one fan installation would be required instead of two.

The adoption of forcing ventilation would have been cheaper than the exhausting arrangement, but was rejected since, with a forcing fan, the mine is ventilated by a positive pressure, *i.e.*, at a pressure above that of the atmosphere, and should the fan stop, the ventilating pressure would fall and any accumula-

tion of gas would tend to spread into the workings.

The effect of stopping an exhausting fan is quite the reverse; in this case the air pressure increases and any tendency for accumulations of gas to spread into the ventilating current is resisted. In the interests of safety it was therefore decided to adopt the more expensive arrangement with the two-fan installation.

From calculations of the ventilation requirements at various stages in the life of the colliery, taking into account gas emission, distribution of output, and resistance of roadways, the fans were designed for the following duties:—Brynlliw fans (one standby)—155,000 cu. ft./min. at 5.75 in. w.g.; Morlais fans (one standby)—135,000 cu. ft./min. at 6.75 in. w.g.

Both fans, which are provided with standby units, are of the radial flow type and are driven through single reduction gear units by 250-h.p. synchronous induction motors, running at a speed of 750 r.p.m. Each fan is fitted with adjustable inlet vanes for regulating the quantity of air to be circulated. This adjustment is of particular importance during the early stages of the life of the colliery when the mine has a large equivalent orifice due to the comparatively short length of the roadways.

Each installation is designed for the construction of the fan drifts above ground level. The fans are situated side by side and individual drifts converge to form a common connection with the air casing at the top of the shaft. Each drift is fitted with a louvre door at the shaft end and a double door on the outside wall.

The fans are arranged with their évasées adjacent to each other and the partition between the évasées is fitted with hinge doors for reversing the ventilation during an emergency.

Progressing the Project

In the construction of every new colliery, speed is essential to limit the accumulation of interest on capital expenditure incurred during the development period. At Brynlliw, speed was also required to ensure the completion of the project in sufficient time to provide alternative employment for men working at those collieries in the Area whose reserves were nearing exhaustion.

Shaft deepening and the drivage of roadways, which was undertaken by the Thyssen Shaft Sinking Company, Limited, were off to a good start, for temporary winders and headgears had already been installed on each of the two shafts.

A programme established for the drivages required a weekly advance of 100 yd. for an average of four drivages proceeding at the same time. The maximum rate of advance actually achieved was 125 yd. per week for all drivages and 42 yd. per week for a single drivage. In order to complete this average rate of drivage, a high degree of mechanization was required in the tunnels and the contractors were greatly assisted by the Westphalia Rake loader.

On the surface, contractors were allowed the minimum periods of time for completion of the various jobs and when, for some reason, a contractor was delayed in starting, the preliminary work such as preparing ground formation or foundation construction was undertaken by NCB labour in readiness for the contractor to take over.

NCB workmen were also employed in the erection of minor buildings, which, if they had been erected by outside contractors, would have been delayed by the period required for tendering.

When the quoted delivery periods of key items of plant did not meet the requirements of the scheduled programme, requests for improved deliveries were made to the manufacturers concerned. By such an approach the delivery of several items of plant was substantially improved.

The use of temporary winding engines on the shafts, although of great value to progress on underground work, raised progress problems in other directions. To change over the shafts from the temporary to the permanent winding arrangements, it was necessary for them to be taken out of commission. The work involved in the change-over consisted of turning the headgear in the No. 1 shaft through an angle of 180 deg. from its temporary to permanent position, dismantling the temporary headgear at the No. 2 shaft and also erecting the new headgear, together with the skip and airlock arrangements.

To take either shaft out of commission would deprive the mine of the second means of egress and, as a result, the drivage work would be curtailed by the limitations imposed by the Mines and Quarries Act on the number of men allowed underground with only one means of egress.

This problem was overcome by establishing an underground connection between Graig Merthyr Colliery and the East intake roadway. To ensure this connection was made before the date scheduled for taking the first shaft out of commission, the driving of the roadway concerned was given priority.

To reduce to a minimum the time required to change the shaft winding arrangements, the headgear for the No. 1 shaft was turned without dismantling and the new headgear for No. 2 shaft was erected over the temporary headgear while the shaft was in operation.

By the end of 1959 the surface arrangements were almost complete, production had commenced in a small way, and progress was approximately nine months ahead of schedule.

Acknowledgment is made to Mr. J. G. Tait, Area general manager, No. 1 (Swansea) Area, for permission to visit the colliery and publish this article and to Mr. J. D. H. Davies, Area production manager, and the colliery staff for their assistance in the collection of the information. Thanks are due to Mr. T. Rosser, deputy Area production manager (planning), who provided much of the information and the illustrations. Thanks are also expressed to the Rhymney Engineering Company, Limited, which supplied information concerning the skipwinding plant and to Unifloc, Limited, for the technical description of the coal preparation plant.

Forthcoming Events

FEBRUARY 6

Society of Engineers:—Meeting at the Geological Society, Burlington House, London, W.1, at 5.30 p.m. Presidential address by W. E. Humphrey.

Society of Instrument Technology (South Yorkshire Section):—Meeting at the University, St. George's Square, Sheffield 1, at 7 p.m. "Some Aspects of Instrumentation in Steelworks," by Dr. R. H. Baulk.

Institute of British Foundrymen (Sheffield Branch):—Meeting at the Technical College, Pond Street, Sheffield, at 7 p.m. "Some Practical Experiences in Making Moulds in a Mechanized Foundry," by H. Pinchin.

Institution of Production Engineers (Manchester Graduate Section):—Meeting at Reynolds Hall, Manchester College of Science and Technology, Manchester, at 7.15 p.m. "Production Engineering Research in the Soviet Union," by R. Tilsley.

Institution of Electrical Engineers (South Midland Centre):—Meeting at the James Watt Memorial Institute, Birmingham, at 6.30 p.m. "Development of H.V. Air-break Circuit-breakers with Insulated Steel-plate Arc Chutes," by F. S. Fay, J. A. Thomas, and J. S. Morton.

FEBRUARY 7

Institution of Plant Engineers:—Meeting at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, at 7 p.m. "Standards in Plant Engineering," by Dr. E. L. Diamond, divisional chief technical officer, British Standards Institution.

Combustion Engineering Association (Northern Region):—Meeting at the George Hotel, Huddersfield, at 2.30 p.m. "Planned Heat Maintenance," discussion introduced by K. F. Coleman (Imperial Chemical Industries, Limited).

Society of Chemical Industry (Corrosion Group):—Meeting at the Engineering Centre, Stephenson Place, Birmingham, at 7 p.m. Short papers.

Institution of Production Engineers (Wolverhampton Section):—Meeting at Denbro, Limited, Soho Hill, Handsworth, Birmingham 19, at 7.15 p.m. Works visit and lecture on "The Production of Form Tools," by D. W. Butchart.

Institution of Production Engineers (Tees-side Section):—Meeting at the College of Further Education, Cleveland Avenue, Darlington, at 7 p.m. "A Consultant's Role in Industry," by A. Beeton.

Institution of Production Engineers (Coventry Graduate Section):—Meeting at the Lecture Theatre, Courtaulds, Limited, Lockhurst Lane, Coventry, at 7.30 p.m. "Automatic Equipment in the Metal Finishing Industry," by S. H. Grindrod.

FEBRUARY 8

Combustion Engineering Association (Scottish Region):—Meeting at the Royal Hotel, 5, Union Street, Dundee, at 10 a.m. Discussion on "Scheduled Maintenance of Boiler Plant and Auxiliaries" (opened by L. M. Kenneth) and "Performance and Cost Control" (opened by C. W. Scott).

Institution of Plant Engineers (East Midlands Branch):—Meeting at the Sherwood Hotel, Theatre Square, Nottingham, at 7 p.m. "Some Problems in the Design of Large Rocket-engine Test Beds," by R. H. B. Forster and L. Breen.

Institution of Plant Engineers (Leicester Branch):—Meeting at the University of Leicester at 7.30 p.m. Fuel Efficiency Forum.

Institution of Plant Engineers (Western Branch):—Meeting at the Grand Hotel, Broad Street, Bristol, at 7.15 p.m. "Foundry Development," by D. Potts.

Institution of Production Engineers (Preston Section):—Meeting at Accrington College of Further Education, Sandy Lane, Accrington, at 7.30 p.m. "Gears," by H. R. Stansfield.

Institution of Production Engineers (Dundee Section):—Meeting at the Royal Hotel, Union Street, Dundee, at 7.30 p.m. "Small Quantity Flow Line Production," by E. Pennington.

Institution of Mechanical Engineers:—Meeting at 1, Birdcage Walk, Westminster, London, S.W.1, at 6 p.m. "The Influence of Measuring Force, Stylus Radius, and Surface Finish on the Accuracy of Measurement of Work-pieces by a Comparator," by L. W. Nickols and T. R. J. Oakley, and "An Investigation into the Accuracy of Industrial Measurements of Sizes Between 0.02 in. and 5 in.," by P. W. Harrison.

FEBRUARY 9

Society of Instrument Technology (Cheltenham Section):—Meeting at the Belle Vue Hotel, Cheltenham, at 7.30 p.m. "Instrumentation at Berkeley Power Station," by F. J. Benstead.

Society of Instrument Technology (Liverpool Section):—Meeting at the M.A.N.W.E.B. Industrial Development Centre, Liverpool, at 7 p.m. "Flame Failure Equipment," by A. M. Lock.

Manchester Geological and Mining Society:—Meeting at the Wigan and District Mining and Technical College at 3.15 p.m. "Interim Report on Powered Supports in the North-west," by J. G. Hind, W. Bibby, and F. Gerrard.

Institution of Plant Engineers (Glasgow Branch):—Meeting at the Scottish Building Centre, 425, Sauchiehall Street, Glasgow, C.2, at 7.15 p.m. "The Use of Gas in Industry," by R. W. Deans.

Institution of Production Engineers (Western Graduate Section):—Meeting in the Small Lecture Theatre, Faculty of Engineering, Queen's Building, University of Bristol, University Walk, Bristol 8, at 7.30 p.m. "Research into Human Performance in Industry," by Dr. S. Griew.

FEBRUARY 10

North East Coast Institution of Engineers and Shipbuilders:—Meeting at the Mining Institute, Newcastle-upon-Tyne, at 6.15 p.m. "Heavy-lift Vessel 'Adventurer'," by C. Stephenson.

Society of Instrument Technology (Midland Section):—Meeting at the Gosta Green College of Technology, Aston Street, Birmingham, at 7 p.m. "Process Control," by R. M. J. Withers.

Institution of Production Engineers (Ipswich and Colchester Section):—Meeting at Britannia Works Canteen, Davey, Paxman & Company, Limited, Colchester, at 7.30 p.m. "Further Training of University Graduates with Particular Reference to Production Engineering," by S. H. Potter.

FEBRUARY 11

North of England Institute of Mining and Mechanical Engineers:—Meeting at the institute, Neville Hall, Newcastle-upon-Tyne 1, at 2.30 p.m. "Ventilation and Dust-extraction Systems with the Joy Continuous Miners at Easington Colliery," by R. Robinson.

FEBRUARY 12

Society of Instrument Technology (Grangemouth Section):—Meeting at the Leapark Hotel, Grangemouth, at 7 p.m. "Flame Failure Devices."

FEBRUARY 13

Lincolnshire Iron and Steel Institute:—Meeting at the North Lindsey Technical College, Kingsway, Scunthorpe, at 7.30 p.m. Films.

Institution of Electrical Engineers (South Midland Supply and Utilization Group):—Meeting at the College of Advanced Technology, Gosta Green, Birmingham, at 6 p.m. "The Application of Low-pressure Resins to Some High-voltage Switchgear Designs," by T. R. Manley, K. Rothwell, and W. Gray.

National Association of Colliery Managers

FEBRUARY 6

South Midland Branch:—Meeting at Ashby Rescue Station at 4 p.m. "Further Developments with the Monorail," by S. McKee.

FEBRUARY 9

South Wales Branch:—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 6 p.m. "Recent Developments in Blasting in Headings," by W. W. Rankin, divisional explosives engineer, South-Western Divisional Coal Board.

FEBRUARY 14

Yorkshire Branch:—Meeting at the Miners' Welfare Hall, Brodsworth, at 3 p.m. "Self-advancing Supports at Cortonwood Colliery," by E. H. Lunness.

FEBRUARY 20

Midland Branch:—Meeting at the Five Ways Hotel, Nottingham, at 6.30 p.m. Paper by C. Rhodes and E. P. Lawrence.

FEBRUARY 23

South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch:—"Costs, as they Affect the Colliery Manager," by J. W. Evans.

FEBRUARY 24

Lancashire Branch:—Annual dinner and dance at the Pack Horse Hotel, Bolton.

Kent Branch:—Meeting at the Swan Hotel, Deal, at 7.15 p.m. "The Geological Structure of the Kent Coalfield," by R. Lamb, divisional geologist, South-Eastern Divisional Coal Board.

PHYSICAL SOCIETY EXHIBITION

Instruments for Use in Steel Industry

Among the hundreds of new and improved instruments shown at the 45th Physical Society Exhibition in London last week were some to interest the scientists and technicians of almost every industry, our Metallurgical Editor reports. These notes, however, are mainly concerned with some of the items of particular interest to the steel industry. They also include mention of the many exhibits of equipment for data processing and computing and close-circuit television, which, though not produced specifically for the steel industry, are applicable in that field. In this category is the Tele-remoscope by Cawkell Research & Electronics, Limited.

THE Tele-remoscope is a new type of television picture monitor which allows the user to produce on the cathode-ray tube screen a still image at any instant during a changing picture. The resulting image may be examined for long periods. This monitor can be applied to the inspection for moving or momentarily stationary objects in automatic production lines. By "freezing" the image the inspection time can be greatly increased over that normally available. This and other features were demonstrated on a prototype.

This exhibition provided a good opportunity for the various research associations to propagate their results and this year the DSIR stand housed some two dozen exhibits. Here one learnt that the National Engineering Laboratory has constructed an apparatus which will generate pressures in excess of 100,000 atmospheres in conjunction with temperatures of over 2,000 deg. C. The formation of new materials of technical interest, such as the synthetic diamond and cubic boron nitride, will be studied with this apparatus.

High-temperature Ceramics

New high-temperature ceramics to supersede metals and traditional ceramics are being produced on a pilot-plant scale at the laboratories of the British Ceramic Research Association. Among those exhibited were boron nitride, a low-friction, machinable electrical insulator, silicon nitride, a strong chemically inert material, and self-bonded silicon carbide, a dense material of high strength and erosion resistance at high temperatures.

The British Glass Industry Research Association exhibited an automatic thermal expansion apparatus, which although initially designed for measurement of the thermal expansion of glasses up to the annealing point, is eminently suitable for dilatometric measurements of other materials. The instrument, which has a built-in calibration unit and accommodates a 4-in. sample length, can be semi- or fully-automatic as required, and in its present form may be used for annealing and heating cycles up to 800 deg. C., but this temperature can be extended.

A carrier-gas method of hydrogen determination has been developed by the British Welding Research Association. A determination takes about 15 min. Argon is passed over a sample of steel, which is heated in a furnace. The hydrogen evolved is swept along in the argon stream to a hydrogen sensitive electric conductivity cell, the output of which is plotted on a conventional chart recorder. Ingress of air during sample loading is avoided by a special loading lock and a special burette is used for injecting small measured volumes of hydrogen gas for calibration. The estimated precision of the method, using a 5 g. steel sample containing 1 ml. hydrogen per 100 g. steel, is ± 0.04 ml./100 g.

The exhibit of the British Steel Castings Research Association was a radioactive tracer technique for investigating the origin of inclusions in steel castings. In this technique molten steel flows over clay-bonded sand compacts in which the silica grains have been coated with activated ceria. Auto-radiography is then employed to study the inclusions in the steel casting and elucidate the mechanism of their formation from interaction between slag, steel, etc., and the sand.

Today it is the continuous high-rate production lines which are demanding additional measuring and control instruments. An urgent demand arises in the production of steel strip. Here the continuous measurement of the reduction in gauge in the temper rolling of strip is a demand still unfulfilled. A new approach to the problem was exhibited by the British Iron and Steel Research Association. In the prototype instrument two photocells are sighted on two illuminated spots on the strip surface, the two spots being a fixed distance apart and lying along the passline. Small irregularities in the light reflected from the strip surface give rise to a pattern in the output of the first photocell. After an interval of time, depending on the distance apart of the two photocells and the strip speed, another similar pattern appears in the second photocell.

Thus, if the output of the first photocell signal is delayed (*e.g.*, on a tape recorder) and then added to a second photocell signal, a maximum combined output will be obtained when the delay time intro-

duced is equal to the time for passage of a point on the strip surface between the two illuminated spots.

From this delay time and the known distance between the illuminated spots the strip speed can be readily calculated.

Improved steel strip production is the objective of another BISRA development, which, when perfected, will enable tinplate and cold-rolled strip to be inspected in a high-speed line for surface defects. The prototype instrument has reached the "field trial" stage.

The Evolute Camera

Another BISRA exhibit was the evolute camera. This was developed originally as an aid to the work on soil corrosion of iron and steel pipes which BISRA is engaged on, but it will doubtless find other applications. The camera unit reproduces on a single flat plate an image of the complete surface of a cylindrical specimen. The cylindrical specimen is mounted on a chuck which is rotated by a motor, which also moves a film carrier in a direction perpendicular to the axis of the specimen. This carrier is provided with a narrow horizontal slit behind which a film passes, the arrangement being such that as the surface of the rotating specimen passes the field of view of the aperature a continuous image is recorded on the film. A complete photograph of the whole surface of the specimen is thus obtained. The speed of rotation can be adjusted by means of a friction drive to the chuck and the unit can, therefore, be used to photograph specimens of varying diameters. In addition, the camera has twin lenses so that stereoscopic photographs can be taken.

Atmospheric pollution is hard to measure and, hence, the atmospheric sulphur dioxide recorder developed by the Medical Research Council Atmospheric Pollution Unit, St. Bartholomew's Hospital, London, E.C.1, is a welcome achievement. It will help to put the study of air pollution by the domestic fire, power stations, steel, and other industries on a more quantitative basis. The apparatus, which was exhibited on the stand of the National Physical Development Corporation, consists essentially of a small conductivity cell of capacity 1 ml. into which can be poured, at fixed intervals of time, 0.1 volume peroxide, the electrical conductivity of which can be measured through use of two small electrodes connected to a recorder via an electronic amplifier. Air, carrying the sulphur dioxide to be measured, is blown by fine jet on to the peroxide surface and the dioxide is absorbed with 99 per cent. efficiency.

The record from the instrument is in the form of a saw tooth, indicating the increase in solution conductivity following the continuous dioxide absorption. A period of about 20 min. per saw tooth is employed and the amplitude shows the general level of atmospheric sulphur dioxide pollution from hour to hour. Minute-to-minute concentrations can be estimated from the slope at any point.

New and improved techniques for metallurgical investigation figured prominently in the exhibition. Some of these require expenditure on a scale that can only be met by a large organization and others only a modest outlay. Cooke, Troughton & Simms, Limited, exhibited a stereoscopic microscope of different design from the conventional form of stereoscopic microscope. Instead of having twin objectives inclined inwards so that their optic axes meet in the plane of the specimen, it uses one objective, and an optical system in the body of the microscope passes left- and right-handed images to the eyepieces to produce the sensation of depth. Thus the same effect is produced as with the more usual type of stereoscopic microscope but with the advantages of a constant working distance and a flat field of view.

A scanning electron-probe X-ray microanalyzer, now in production, was exhibited by the Cambridge Instrument Company, Limited. The technique of X-ray microanalysis consists of focusing an electron beam, normally accelerated from 0 to 50 kV, on to a region of the specimen surface approximately 1 in. dia. and rather less in depth and analysing spectroscopically the resulting X-rays excited from the specimen.

So far, the technique has been used almost exclusively for research work on metallurgical problems, although it also has applications in biological and other fields.

As well as static probe point-by-point quantitative microanalyses, the Cambridge instrument can also be used for scanning the surface of the specimen over an area up to $\frac{1}{2}$ mm. by $\frac{1}{2}$ mm. The characteristic X-rays from any single element (with atomic number 12 or greater) can be selected by a crystal spectrometer and detected by a proportional counter. The signal from the counter modulates the brightness of a beam scanning a cathode-ray tube, in synchronism with the probe scanning the specimen, and forms an image corresponding with the area scanned and showing semi-quantitatively the distribution of the chosen element.

The accuracy for quantitative analysis is to ± 1 per cent. which reduces, under favourable conditions, to 0.1 per cent. The minimum concentration that can be detected under good conditions is 0.1 per cent.

Plastic Flow Study Technique

Among the Post Office Engineering Department exhibits was an inexpensive technique for studying plastic flow which can be applied to the study of a wide range of metallurgical problems such as plastic flow in forming and extrusion. Devised originally for investigating contact deformation, it enables the effects of friction and rate of deformation, and of shape and internal constraint, to be readily examined. The technique employs two-colour laminated test-bodies made from "Plasticine"; the laminations can be oriented in any direction.

New thermocouple elements for measuring temperatures in the range 1,600 to 2,000 deg. C. were exhibited by the Morgan Crucible Company,

Limited. Some of the materials, being semi-conductors, provide a very high voltage output compared with metals. For example, a silicon carbide—graphite couple can be made to give 0.2 V at 1,000 deg. C. Modification of the properties of silicon carbide and graphite, by controlled adjustment of composition, allows couples to be made from two types of silicon carbide, or two types of graphite. Alternatively, any of these materials can be run against a refractory metal such as tungsten or rhenium.

Also among the exhibits of the Morgan Crucible Company was a technique for hot-stage time-lapse ciné photomicrography, which allows one to follow under a microscope the slow changes in crystal form or other visible qualities of solid materials An electrically operated camera is used to take a series of single shots with variable exposures at intervals of 1 min. The resulting ciné film can be used for quantitative measurements.

New vibratory and electrolytic polishing equipment was shown by Nash & Thompson, Limited. The vibratory polisher can polish any number of specimens from two to 18 in one loading and will operate with no attention. Thus, a batch of specimens can be polished overnight. A finish suitable for electron microscope examination can be obtained. The electrolytic polisher consists of a "swirl head" assembly into which the specimen is mounted and subjected to an applied potential while the surface is in contact with a continuous flow of electrolyte.

Book Reviews

David Brown's—The Story of a Family Business, 1860-1960. By Desmond Donnelly, MP. 128 pp. 29 illustrations. Collins, 14, St. James's Place, London, S.W.1. 21s.

MOST books of this type start right at the beginning, as it were, with a pen-portrait of the founder of the company and a description of the firm's original premises. In this volume, however, the author, well known as a politician, writer, and broadcaster, chooses first to tell his readers something about the present chairman and managing director of the David Brown Corporation, Limited, Mr. David Brown, grandson of the founder of the family business. But with the second chapter he really begins to relate the story of the organization from its earliest days, and about its founder, then a youth of 17.

It is indeed a fascinating story and Mr. Donnelly, who has been associated with the David Brown Corporation for a number of years, is surely the right man to tell it. David Brown's had a beginning in keeping with the earliest days of many of Britain's great industrial undertakings, the first premises, in Vulcan Street, Huddersfield, being part of the stables belonging to Thomas Broadbent's foundry. The first entry in the order-book was wooden patterns for David Brown's landlord's foundry. The story of development unfolds gradually, but always entertainingly, until we reach the stage when we learn something of the organization that makes some of the best gears, castings, and machine tools in the world, outstanding agricultural machinery, and the great world champion of sports cars—the Aston Martin.

Throughout, due credit is given to those who have been responsible for the growth of this now mighty cog in Britain's industrial pattern, but it is obviously the present chairman of the company who has been responsible for the major part of the organization's development.

This is United Steel. 55 pp. United Steel Companies, Limited, The Mount, Sheffield 10.

FORMED in 1918 by the amalgamation of a number of iron and steel works, all of which had been established for many years at that time, the United Steel Companies today employs over 38,000 people, produces about one eighth of the steel made in Britain, and markets a wider variety of steel products than any other British company. In addition to four large iron and steel works, the company operates an engineering works which includes one of the largest ironfoundries in the country, a structural steelwork company, important coal carbonization and chemical plants, and a locomotive works. It also owns extensive ore-mining properties in the east Midlands and in Cumberland.

That, in broad outline, is the scope of this vast organization. "This is United Steel" gives a more detailed illustrated account of the activities of the group, some of the constituent companies of which bear names almost as famous as the parent company itself—Steel, Peech & Tozer, Appleby-Frodingham, Samuel Fox, Workington Iron & Steel, and so on. Each of these units has a section to itself in the book and each one is prefaced by a brief historical introduction.

We learn that a south Yorkshire brickmaker, Joseph Cliffe, founded the Frodingham Iron Company at Scunthorpe in 1865 with the object of utilizing the extensive local deposits of low-grade iron ore, and that there was a Roman fort and permanent garrison on the present site of Steel, Peech & Tozer in Rotherham for some 300 years; iron was being made in an "industrial annexe" to the fort during much of this long period, but it was not until the Victorian era that the industry was firmly re-established. The combined assets of earlier and less successful enterprises were acquired by Steel, Tozer & Hampton in 1875, which was renamed Steel, Peech & Tozer eight years later, its vigorous growth owing much to its principal architect, Mr. Henry Steel, who, having made one fortune in bookmaking, went on to do the same in steel.

Interesting as the historical background to these various companies is, it is naturally to the current and future activities of the units that our attention is centred by this excellent publication. The book is a valuable guide to United Steel and, inevitably, of great interest to all concerned with British steel.

JAPANESE STEEL EXPERTS are visiting Western Australia to investigate coal, iron, and bauxite deposits in the south-west. They will examine also the possibilities of a sponge-iron industry in the southern part of the State. The State Government is adopting a somewhat cautious attitude in the matter, as the prospect of this industry is by no means certain.

FINANCING KAWASAKI STEEL'S EXPANSION

THE First Boston Corporation has joined the World Bank in a simultaneous transaction to provide $10,000,000 to the Kawasaki Steel Corporation, a private Japanese company. The First Boston Corporation, acting as bankers for Kawasaki, has privately placed with institutional investors $4,000,000 of Kawasaki notes. The World Bank made a loan equivalent to $6,000,000 to the Japan Development Bank, which will relend the proceeds to the Kawasaki Steel Corporation. The funds will be used to finance part of the cost of installing a plate mill and auxiliary facilities at Kawasaki's works at Chiba, near Tokyo.

Since rehabilitating war-damaged facilities, the Japanese steel industry has engaged in a series of expansion and modernization programmes to keep pace with the steadily rising domestic demand for steel and steel products. Besides expanding ingot steel capacity, the current programme is designed to enable the industry to meet the demand for higher quality and wider range of products and to reduce operating costs by the modernization of plant. Previous World Bank loans have been made to assist the programmes of leading Japanese steel producers and, by participating in the joint operation with American institutional investors, the bank is assisting the Kawasaki company to enter the US capital market for the first time.

Kawasaki, one of the largest steel companies in Japan, has, in recent years, produced 7 to 9 per cent. of the total Japanese output of rolled steel products. It accounted for about 18 per cent. of total Japenese sheet production in 1959. The Chiba plant, the company's main works, is now one of the most modern and efficient plants in the country. This is the third World Bank loan for construction of new facilities at the Chiba works.

The modern plate mill being financed by the new borrowings is needed by Kawasaki to replace obsolete equipment. It will have a nominal annual capacity of 600,000 tons, replacing facilities having a capacity of 400,000 tons. The project is part of a programme to expand and modernize Kawasaki's production facilities to increase annual blast-furnace capacity from 720,000 tons to 1,260,000 tons and steel ingot capacity from 1,600,000 tons to 2,300,000 tons. In addition to reducing production costs, Kawasaki will be able to improve the quality and range of its finished products.

Kawasaki has already spent over $40,000,000 on this programme; the company's total financial requirements during the two years ending April 30, 1962, will amount to an estimated $52,600,000. The latest borrowings will cover $10,000,000 of the required finance; the remainder will be met by a $2,000,000 loan which Kawasaki recently obtained from the Hanover Bank in New York, $34,600,000 from retained earnings and depreciation, and $6,000,000 from debentures to be sold in Japan.

International Conference on Materials Handling

ONE of the four sections at the second international conference organized by the Institute of Materials Handling, to be held, as already announced, at Southport (Lancs) from May 10 to 12, will be devoted to heavy industry and will include a paper of special interest to the steel industry, particularly with regard to sheet steel. The paper, "Handling the Raw Materials in a Heavy Industry," will be given by Mr. H. J. Stengert, assistant manager, industrial engineering department, August Thyssen-Hütte, Duisberg, Germany.

There will be three other papers in the heavy industry section and four in each of the other three sections of the conference, which will be devoted to light industry, extractive mineral and chemical industries, and agriculture and food production.

Opening address at the conference, by Mr. C. Metcalfe, managing director of E.M.I. Electronics, Limited, will be on the theme "Materials Handling as a Co-ordinating Stimulus Throughout Industry," while the concluding address, by Mr. H. St. Leger, general secretary of the International Organization for Standardization, will be on "Standardization and Materials Handling." Full details of the conference may be obtained from the institute at 32, Watling Street, London, E.C.4.

Polish Steel Industry's New Five-Year Plan

SUCCESSFUL implementation of the 1956-60 plan is announced by the Polish steel industry. Steel production in 1960, the best year, was over 6,600,000 tons. Blast-furnace capacity is officially reported to have increased by 24 per cent. in the last five years, while the capacity of the steel mills increased by 23 per cent.

Major developments under the five-year plan include five new coking plants, a blast furnace of over 53,000 cu. ft. capacity at the Lenin Steelworks, three electric and three open-hearth furnaces at the Warszawa Steelworks, five "powerful" 360-ton open-hearth furnaces at the Lenin works, and modern hot- and cold-sheet rolling mills and a blooming mill at the Warszawa works. Several departments in the older steelworks have also been modernized.

Expenditure on the expansion of the iron and steel industry will, in the new five-year plan, increase by nearly 70 per cent. over the previous plan. Steel output is expected to reach 9,300,000 tons by 1965.

BRITISH STEEL AT LEIPZIG

IN the steel section of the Leipzig Spring Fair, which opens on March 5, 51 British firms will be exhibiting, compared with 35 in 1960. Floor space in this section has risen from about 6,260 sq. ft. last year to 12,420 sq. ft.

Colvilles, Limited, Glasgow, which supplies large quantities of stainless steel clad plates (under the trade name "Colclad") to the German Democratic Republic, will be among the exhibitors.

INCREASING EFFICIENCY IN MINING

Presidential Address to the IME

The need to raise the efficiency of the mining industry figured largely in the presidential address given by Mr. Robert A. Moore to the Institution of Mining Engineers on Friday. Although productivity has been increased in recent years, there are signs that production is being lost at highly efficient pits. The method of arresting these adverse trends are discussed in the address, abstracts of which are given here. The full text will appear in the Mining Engineer, published by the IME.

UNFORESEEN delays in building up new collieries to their optimum peak of production has in some case slowed down the degree of concentration at the higher efficiency collieries. The Revised Plan for Coal postulates that by 1965, the desired output of 200,000,000 to 215,000,000 tons per year will be produced from only 550 collieries, and that 80 per cent. of this production will come from new or reconstructed collieries.

The manpower difficulties foreseen in 1949 have proved to be only too real, and in a number of districts high-efficiency production is being lost because of manpower shortages at the required places. Apart from manpower recruitment, in which encouraging results are being achieved, these difficulties can be overcome by a conscious determination by all engaged in the mining industry to ensure that no unnecessary labour will be utilized in any of the processes of coal production.

In the actual mining of coal, any manpower review may be sub-divided into the process of developing underground workings to the point of coal production and the operation of the actual coal-producing district. The latter must be planned so as to get the greatest possible degree of productivity from the coal faces. This will normally involve the use of an increasing degree of power loading designed to raise face o.m.s. and, at the same time, it will be necessary to get the maximum bulk output from each working face, either by having a longer face or by achieving greater penetration.

It will be essential to study each individual layout and to decide whether the optimum results are going to accrue from increased length of face or from deeper pentration, and there are many factors which will need to be considered.

In certain high-quality coals, it may be necessary, for the time being, to use a less productive type of power loader in order to keep up large-coal tonnage. This is thought to be a temporary phase and all possible alternatives should be tried before abandoning the use of a machine which would give higher efficiency of production.

In this connection, it is right that we should pay tribute to the astonishing successes which have already been achieved in getting as much coal production as possible per day from a given area of coal. Many have read of the result achieved recently at Bickershaw Colliery in Lancashire, when an output of over 2,500 tons was produced by approximately 100 men from one coal face in 24 hours. Working continuously on three shifts per day, this face had a national record gross output of over 9,200 tons for the week.

The previous record for a week's output from one face in this country was claimed by Barrow Colliery in Yorkshire, which produced over 7,300 tons in July, 1960.

In the Lancashire installation, the seam was 5 ft. 2 in. thick lying at a gradient of 1 in 8 on the face line, and the length of the run was 286 yd. The coal was loaded by a shearer fitted with a 44-in. dia. drum and a pre-cut of 36 in. was made.

Although the haulage facilities, while good, were not exceptional, this must mean that there was excellent co-operation and organization by all concerned to achieve this record.

There will always be those conditions where gradients, thinness of seam, abnormal faulting, difficult roof or floor, make it virtually impossible to completely apply mechanical mining. These circumstances may make it most difficult to justify working certain seams at all if conventional mining methods have to be used, as the advantages to be obtained by the full use of mechanization are most substantial.

It is remarkable how the gradient problem at least has been overcome. In a recent visit to Germany to investigate the use of panzer conveyors on gradients of about 1 in 2, it was found that the steep measures did not result in a compulsory shortening of the conveyor runs.

Seams lying on gradients of 1 in 2 were inspected, and in one case, with a 5-ft. thick coal, a face had been laid out using an Anbauhobel and armoured flexible conveyor. The total length of the face was 240 yd. and the layout gave excellent results. Coal was produced on two shifts, advancing 10 ft./day and produced over 1,000 tons of

coal with a 47 per cent. discard. On the saleable yield of 700 tons per day, a face o.m.s. of 9.8 tons was achieved.

The conveyors were said to operate most successfully on the steep gradients. Up to 220 yd. long the practice was to use a single motor drive at each end. Where the faces were longer, up to 260 yd., a third motor was added.

In another case, in a 3-ft. 8-in. seam on a gradient of about 1 in 1.5, a 200-yd. fully mechanized shearer face was seen producing 677 tons per day on two coaling shifts with a daily advance of 10 ft. 6 in.

Underground Transport

To produce daily outputs of over 1,000 tons per day from an individual face, there must be a most effective haulage layout if the advantages of concentration of output are not to be lost.

In horizon-mining schemes, there is always the need to establish the maximum amount of coal which can be transported on each cross-cut and lateral, and in this connection some figures which were obtained from Germany and Holland on a recent investigation may be of interest.

It was found that the maximum concentration of coal which was planned to be taken from one cross-cut was about 1,500 tons per shift, using mine cars and locomotives, and that tonnages of 1,000 to 1,250 tons per shift were common. It was also found that two loading points were permissible on one cross-cut provided there was a distance between them sufficient to hold three train-lengths of mine cars under the best conditions. In adverse conditions, for example, where roadway maintenance was difficult, it might be necessary to have space for four or even five trains between the loading points.

Another aspect of transport which can squander labour is in the handling of materials. There has long been a need for an efficient method of taking in necessary materials alongside gate-road conveyors, or in the endroads, and a number of most ingenious devices have been adopted; for example, the suspended carrier rope, or the floor-mounted or suspended monorail. A very recent development has been to design a supplies vehicle which is capable of carrying a load of 1 ton over the normal mining roadways up to gradients of 1 in 4.

One major advantage which follows the concentration of output at as few places as possible in a colliery, is that it is simpler to allocate the men. This can be considered in several stages, and it is probably logical to deal first with the need to ensure that too many men are not employed on any one job. Method study, which brings scientific analysis to what was done in the old days by rule of thumb or past experience, can be of very great assistance.

Having achieved a degree of output concentration at the faces, it is usually easier to justify the installation of mechanical aids at loading and transfer points which will ensure that, as far as possible, every man is given a full day's work, from the time element sense.

On loading points, a great deal of work has been done, possibly in recent times more with the aim of minimizing breakage of coal. Many excellent designs are to be seen which deal with high tonnages of up to 3,000 tons per shift with a minimum of manpower, and this is a fundamental requirement when the concentration of output is being planned. Similarly with the handling of materials. Method study can be used most effectively and bulk output can again justify the use of adequate mechanical aids at limited points.

A point which will, of course, be brought out by method study, is the need to avoid any delay in the men reaching the working face. Manriding is an essential feature and large production units again mean that full teams must be transported with as little delay as possible. This makes the use of manpower deployment charts vital, as otherwise complete districts could well be held up till absentees' places were filled.

Efficiency in the Winding of Coal

Much has been done to improve the winding facilities at collieries; too often this has been a "bottleneck" which limited drastically the ability of a colliery to strive for a large increase, either in bulk output or in tempo of coal production at the face. In new sinkings and reconstructions, it is possible to make special arrangements—usually one shaft is kept solely for the winding of coal and the other for winding of men, materials, and stores.

At the deeper shafts, the need to increase the payload carried has resulted in the introduction of a number of skips, which have also a high degree of man-usage efficiency. At this time there must be some doubt as to the wisdom of this, in that it is most difficult to prevent undue degradation of coal in skipwinding, but, in the longer term, it appears certain that the benefits will be greater than the temporary disadvantages of some increased breakage.

There have been some great advances on the Continent in the handling of coal, and it is understood that recent installations in Germany are, to all intent, fully automatic, from the coal being discharged from the mine car into the skip pockets until the time it is delivered to the preparation plant.

Even where skips are not used, it is possible, by the use of either compact back-shunt circuits or by traversers, to deal with high concentrations of output while employing the minimum of men. The introduction of compressed-air decking rams to handle the cars can also improve capacity and save manpower.

It is now becoming common practice at the surface to use mobile equipment wherever possible to deal with the movement of materials to the shaft, and the fork-lift truck has many applications. More can be done, for instance, by the packaging of timber and other material before it is transported underground, and with greater bulk output from a face it become even more important to avoid any delay in providing the necessary supplies.

The use of method study can be extended to many other surface operations. For example, a very revealing picture was obtained recently when a

method study investigation was carried out on all lamp-cabins throughout a division and comparisons drawn. The results were set out in the form of a graph with one axis denoting the number of lamps serviced, and the other the number of lamproom attendants. From this a divisional standard of manpower for self-service lamprooms was set out, again in the form of a graph, and each Area general manager was asked to authorize, personally, any case in his Area where, by reason of special circumstances, the manning as recommended could not be attained.

A similar study was carried out at stockyards to obtain optimum manning for given colliery outputs, and again savings were found possible, although there were more variables in this case. One colliery might be using timber, and another special props.

Colliery Organization

There is a growing realization that the management chart of one of the large new collieries with a high degree of mechanization and concentration calls for the very best type of official. The problems arising at a colliery producing between 4,000 and 6,000 tons of coal per day are quite different from the smaller pits.

Most of these collieries will wind coal on at least two shifts, and there will be general agreement that the status of the underground official in charge of the two shifts, other than dayshift, calls for some attention. Already a number of appointments have been made on the second coal-production shift of men holding first-class certificates, and this practice must be extended, without, of course, taking away from the overriding authority of the manager or agent/manager.

The services provided by the engineers and electricians of the mines will play an increasingly important part in the drive to improve face and overall efficiency. In Great Britain, the principle of planned maintenance has now been generally adopted, and, with the setting up of Area central workshops throughout the country, planned withdrawal of equipment has now become a practical reality.

The engineering organization established in Germany is a most elaborate one compared with that normally found in Britain. Dr. E. Anderheggen, in a paper delivered to the annual convention of the Association of Mining Electrical and Mechanical Engineers in 1960, gave illuminating facts about the organization of Friedrich Heinrich Colliery.

The colliery produces an annual output of 2,300,000 tons of saleable coal, and the average daily output from each longwall face is 600 tons of clean coal, with some faces producing nearly double that amount. The average face o.m.s. is over 112 cwt. and the overall figure 37½ cwt.

On the general organization, there is a technical general manager who controls a works manager and the coking plant manager. The works manager has under his command a managing director (underground), who controls all underground activities, and a manager of general surface plants, who deals with all surface equipment.

The managing director (underground) in turn controls three main officials:—The managing inspector; the chief engineer, and the safety officer. All these officials are of equal status and have very clearly defined duties for which they are held responsible.

Dr. Anderheggen stated that about 450 mechanics and electricians are employed underground out of a total of 4,050 workers—a figure considered justified in dealing with 9,000 tons of coal per day by fully mechanized means.

The proper staffing of our large new collieries is a matter which calls for very careful consideration, and it may be that the Institution of Mining Engineers could, with advantage, set up a special committee to carry out some investigations and make recommendations.

There will, however, be a number of collieries in this country which will continue to operate efficiently at very much smaller tonnages, and the principle of maximum concentration of output must equally apply to them. The organization in these collieries becomes much simpler, although it is a matter of degree. For example, the aim must still be that engineering staff shall take over (always having regard to the Mines and Quarries Act, 1954) much of the responsibility for keeping the power loaders and other equipment in efficient operating condition.

The process of regular, planned withdrawal of equipment to Central Workshops which is presently being built up, will operate at these smaller collieries in perhaps greater degree than may be the case ultimately at the larger collieries.

It is regular practice at the large continental collieries to have well-equipped underground workshops where engineering staff, both mechanical and electrical, are stationed to carry out routine repairs to equipment and also to be available for emergency breakdowns. This has some advantages, but perhaps the planned withdrawal system is better.

The one fact which has been proved is that, in cases where high-capacity power loads are operated, there must be an adequate number of skilled engineers and electricians at hand to deal immediately with any breakdown, as uninterrupted operation of the face plant is essential. There is, therefore, a real need for the industry to maintain a staff of engineers and electricians of sufficient size, and trained in modern techniques, in view of the increasing programme of power loading.

Varying estimates have been made as to the degree to which power loading can be applied—in specially favoured districts the percentage power loaded has already reach 75 per cent. or more—but it is certain that substantially more than half the British output will come from mechanized faces. This may need a major change in thinking as regards the training of the miner himself—in the future he may need to know more about the spanner than the shovel—but this should make his job more attractive and should help recruitment.

British and World Shipbuilding

LLOYD'S REGISTER RETURNS FOR DECEMBER QUARTER

STEAMSHIPS and motorships of over 100 tons gross under construction in Great Britain and Northern Ireland at the end of December, according to Lloyd's Register Shipbuilding Returns, totalled 258 ships of 1,694,188 tons gross. This is 59,655 tons less than the previous quarter and is the lowest figure since June, 1946. The highest post-war figure was 2,345,408 tons at the end of 1957. The total comprises 90 ships of 630,797 tons fitting out afloat, and 168 of 1,063,391 tons still to be launched.

Commenced during the quarter were 53 ships of 257,223 tons; launched, 67 ships of 376,222 tons, and completed, 57 ships of 322,653 tons.

Vessels under construction included 49 steamships of 854,004 tons and 209 motorships of 840,184 tons. In other Commonwealth countries there were under construction five steamers of 69,899 tons and 38 motorships of 125,512 tons. Oil tankers building in Great Britain and Northern Ireland totalled 46 ships of 806,527 tons, which is 27,173 tons less than the June quarter. Total construction in the principal districts is shown in Table 1.

TABLE 1.—*Shipbuilding Construction in Hand in Principal Districts of Great Britain and Northern Ireland.*

District.	December 31, 1960.		September 30, 1960.		December 31, 1959.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	13	7,812	15	8,255	17	14,685
Barrow ..	2	51,500	3	92,500	2	92,500
Belfast	12	226,285	11	197,970	15	282,850
Bristol	3	4,016	2	1,930	3	4,544
Clyde:						
Glasgow ..	50	346,952	54	424,226	51	475,529
Greenock ..	17	108,054	19	134,488	22	164,519
Dundee	3	12,400	4	12,614	5	23,923
Hartlepool ..	2	19,600	2	22,250	3	31,690
Hull	38	14,476	33	12,938	37	14,564
Leith	5	27,610	6	42,220	9	42,334
Liverpool ..	6	71,830	7	92,540	11	123,547
Middlesbrough ..	10	183,120	8	146,010	9	137,172
Newcastle-upon-Tyne ..	35	385,161	33	331,440	31	369,634
Southampton ..	11	8,116	11	11,040	14	12,092
Sunderland ..	20	220,094	20	215,162	23	234,382

Sizes of steamships and motorships under construction at the end of December in Great Britain and Northern Ireland included the following:—100 to 500 tons, steam nil (motor 93); 500 to 1,000 tons, steam 1 (17); 1,000 to 2,000 tons, steam 11 (15); 2,000 to 4,000 tons, steam 2 (4); 4,000 to 6,000 tons, steam 2 (4); 6,000 to 8,000 tons, steam 1 (21); 8,000 to 10,000 tons, steam nil (22); 10,000 to 15,000 tons, steam 6 (26); 15,000 to 20,000 tons, steam 3 (6); 20,000 to 25,000 tons, steam 4 (1); 25,000 to 30,000 tons, steam 8 (nil); 30,000 and under 40,000 tons, steam 7 (nil); 40,000 tons and above, steam 4 (nil).

Abroad

Steamships and motorships under construction at the end of December totalled 1,140 ships of 6,972,894 tons gross, a decrease of 84,679 tons since the previous quarter. As was then the case, no returns are available for China, East Germany, and Russia (USSR). Tonnage being built abroad is now 933,764 tons below the 7,906,658 tons reported in September, 1958.

Some of the countries abroad had the following tonnages under construction compared with the previous quarter:—Germany (West), 897,723 tons (+5,149); Japan, 896,215 tons (−25,322); Sweden, 808,941 tons (+59,111); France, 655,826 tons (+25,263); Italy, 650,663 tons (−115,524); Netherlands, 616,919 tons (−22,517); USA, 524,269 tons (−25,502); Norway, 357,678 tons (+45,605); Denmark, 258,742 tons (−8,653); Poland, 256,099 tons (−12,986); Yugoslavia, 222,613 tons (+12,970); Belgium, 154,019 tons (−18,759).

Oil tankers under construction abroad total 183 ships of 3,118,947 tons, which is 82,717 tons less than last quarter, and represents 44.7 per cent. of the total tonnage being built abroad.

Apart from those countries already mentioned, there are under construction in the world 1,398 steamships and motorships of 8,667,082 tons, of which 19.5 per cent. is being built in Great Britain and Northern Ireland. The present total is 144,334 tons less than last quarter. The highest post-war figure of tonnage under construction in the world was 10,205,791 tons in September, 1958. Oil tankers under construction in the world amount to 229 ships of 3,925,474 tons (96 steamships of 2,741,199 tons and 133 motorships of 1,184,275 tons), which is 109,890 tons less than the previous quarter, and represents 45.3 per cent. of the total tonnage under construction in the world.

Of the steamships and motorships under construction throughout the world at the end of December, 4,457,465 tons (51.4 per cent.) are to be classed with Lloyd's Register. Of this total 1,651,261 tons, representing 97.5 per cent. of the tonnage being built there, are at yards in Great Britain and Northern Ireland.

THE WEST GERMAN Federal Cabinet has agreed on a Bill by which, over the next three years, Sunday work would be abolished in all branches of the steel industry except for those blast furnaces which for technical reasons must be kept in continuous operation.

New Literature

CATALOGUES, booklets, house magazines, and other publications received recently include those mentioned below. Readers wishing to obtain a copy of any of the items referred to should apply direct to the address given, at the same time mentioning IRON AND COAL.

NATIONAL UNION OF MANUFACTURERS, 6, Holborn Viaduct, London, E.C.1—Three articles on fire hazard—dealing, respectively, with prevention, fighting equipment, and insurance—are included in the January issue of the British Manufacturer (2s.). The other contents offer a varied selection of subjects of interest to the industrialist.

VULCAN BOILER & GENERAL INSURANCE COMPANY, LIMITED, 67, King Street, Manchester 2—Vulcan, a quarterly magazine, is designed to interest power users. The January issue contains short articles on "Cracks that Cripple a Crane," "Good Plant Gone Wrong," "The Riddle of Faulty Boilers," "There's Danger in Dust," and other subjects.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED, 13, Grosvenor Place, London, S.W.1—List 177/2 is the modest, official reference given to a new publication giving a comprehensive description of the company's Microscan X-ray analyzer, which is now in full production. The publication is a handsome 32-page booklet; first-class illustrations enhance the value and appearance of the brochure.

STURTEVANT ENGINEERING COMPANY, LIMITED, Southern House, Cannon Street, London, E.C.4—Two new catalogues have been issued. Publication No. 4104 is a 24-page booklet on "Heating and Ventilation," while publication No. 6904 is a small brochure on "High-efficiency Cyclone Dust Collector." Both items have been issued to supersede earlier publications on the respective subjects.

SOUTH AFRICAN IRON & STEEL INDUSTRIAL CORPORATION, LIMITED, P.O. Box 450, Pretoria—Of particular interest in the December issue of Iscor News is an article on a new coal-preparation plant at Durnacol, the corporation's coal mine in Northern Natal. Two processes—cyclone concentration of the coarser coal and flotation concentration of the fine material—are embodied for the first time in Africa in this plant.

WESTINGHOUSE BRAKE & SIGNAL COMPANY, LIMITED, 82, York Way, King's Cross, London, N.1—Six in the series of mining equipment pamphlets have just been published. They are:—C.P.7, control of mine vehicles in cages; C.P.8, auxiliary valves; C.P.26, combined stop and restarter; C.P.27 (2nd edition), Westinghouse mine traffic control for locomotive haulage roads; C.P.29, propelling unit; C.P.1010, traffic control at the Hawthorn combined mine.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—In May, 1960, AEI published for the first time a technical journal covering the activities of the company as a whole. The event marked a sharp break with the past and the disappearance of house journals which had been well known for many years. The first four issues of the new journal were published as an interim edition. During the period of their production, time and thought were devoted to the format of a monthly journal to commence in 1961. The new journal, AEI Engineering, has made its appearance with a January issue. There is an interesting selection of articles, all by members of the AEI organization, and the general appearance of the magazine is most attractive, good use having been made of colour printing. AEI Engineering is edited by Dr. D. C. Milner.

MCKEE HEAD WRIGHTSON, LIMITED, 16-26, Baltic Street, London, E.C.1—The company is a jointly owned subsidiary of Head Wrightson & Company, Limited, Thornaby-on-Tees, and Arthur G. McKee & Company, Cleveland, Ohio. It is a British company and an attractive brochure has been produced to indicate the scope and versatility of its operations in the design, engineering, and construction of petroleum refineries and chemical plants. The booklet also shows the extent of the experience of the parent firms in more than half a century as leaders in their fields and the services they offer to their customers throughout the world.

NORTH-WESTERN DIVISIONAL COAL BOARD, 40, Portland Street, Manchester 1—Mr. James Anderton, the Coal Board's new chairman in the north-west, intends to do his utmost to ensure that "the North-Western Division is kept in the forefront of modern developments, both at the collieries and in the offices." There is a message from him in the January issue of Pit Prop, which also contains a detailed report of "a night to remember at Bolton Town Hall when Col. and Mrs. Bolton said farewell to the division by entertaining 700 people at a dance." The recent visit to the North-Western Division of the NCB's new chairman, Mr. Alfred Robens, is also reported in this bright and readable eight-page news-sheet.

THE ENGINEERING CENTRE, Stephenson Place, Birmingham 2—The British Trade Fair oversea has established itself as an outstandingly successful way of taking our goods to customers in specialized areas rather than in trying to bring the customers to Britain. The Engineering Centre has played its part by organizing group displays at these fairs in recent years and plans to do so again at the "British Equipment for Mexican Industry" Exhibition to be held in Mexico City from September 29 to October 15. The exhibition is being sponsored jointly by the Dollar Exports Council and the Federation of British Industries and details of the Engineering Centre's plans are contained in the January issue of its News Letter.

RICHARD THOMAS & BALDWINS, LIMITED, 82, Brook Street, London, W.1—The coming of the Spencer Works means a considerable increase in seaborne trade to Newport—and a bigger job for the pilots who guide great ore carriers and tiny tramps alike up and down the Bristol Channel. In the January issue of Ingot (6d.), the RTB quarterly magazine, the editor, Mr. A. J. Crump, with excellent support from Mr. Peter Benoist, his art editor, contributes a most interesting feature on "Pilot Service." The Rev. David Sheppard, warden of the Mayflower Family Centre in the heart of London's dockland, who virtually abandoned a brilliant cricketing career in order to devote himself to this work, explains his task in an interview and gives his forthright idea of the form industry's contribution should take in the work of such missions. The issue also contains several other excellent features.

APPLEBY-FRODINGHAM STEEL COMPANY, Scunthorpe (Lincs)—Disappointment caused by the total number (223) of lost-time accidents at the company's works

during 1960 is expressed in the January 19 issue of the App-Frod Record. The 1959 total was 184 and it was hoped that last year would again bring a total of less than 200. The report adds: "Every encouragement is given to employees to buy and wear safety footwear, and in recent years more and more employees have taken advantage of the facilities provided by the company." In very much lighter vein (but still appertaining to accidents) there is the story of a crane driver who went to the cup-tie against Blackpool and sat in front of a Blackpool supporter. When Scunthorpe scored their fourth goal the Blackpool supporter was so disgusted that he threw up his arms and accidently knocked out the crane driver, who, when he came round (so we are told), had to buy a newspaper to get the result of the match.

TARMAC, LIMITED, Ettingshall, Wolverhampton—Tarmac in Review is the title chosen for the house magazine of the Tarmac group of companies, the first issue of which appeared last month. We quote from the first article in this welcome newcomer to the field of industrial literature: "The year was 1903; the setting a thoroughfare in the small town of Denby, eight miles north-east of Derby. A dray, carrying several barrels of tar, was jolting along on its laboured way when one of the barrels fell off and burst, covering a stretch of the road with wet tar. To allow traffic to pass, someone thought of sprinkling the tar with wet slag debris from the blast furnaces nearby. A trivial accident, perhaps, but it had important consequences. A few months later, the county surveyor of Nottinghamshire, E. Purnell Hooley, came to Denby and chanced to notice that the stretch of road where the tar had been spilt was dustless and remarkably free from wear. The discovery intrigued him and he began experimenting, first with tar painting and gritting, then with coating blast-furnace slag with tar before laying it. Before long he had perfected a product using the latter method and on June 17 of that year he registered a company under the resounding title of the Tar Macadam (Purnell Hooley's Patent) Syndicate, Limited." Thus was born what was destined to be the direct antecedent of what is now the Tarmac group.

CORROSION OF STEEL BY COMBUSTION GASES

AN experimental study described in a paper dealing with an aspect of the corrosion of mild steel by combustion gases submitted by T. K. Ross, M.Sc., Ph.D., A. J. Macnab, B.Sc., Ph.D., and B. E. Leyland, M.Sc.Tech., to the Institute of Fuel and published in the Journal (No. 238, November, 1960) was made because of the uncertainty of the effect of reducing constituents upon the action of sulphurous combustion gases upon mild steel, and because of its importance in some chemical engineering applications.

The widespread occurrence of sulphur in fuels has resulted in continuous interest in the corrosive behaviour of combustion gases, especially with respect to their effect upon furnace structures and auxiliaries. Broadly speaking, the problems encountered divide themselves into wet and dry types of corrosion as well as into categories of low- and high-temperature attack. Naturally, the emphasis of research has been towards those furnace conditions usually associated with the combustion of fuels for thermal purposes. By contrast, the chemical industry embraces some processes where combustion is conducted not only for heating requirements but also to produce a gas or a carbonaceous substance. Under these conditions the corrosive behaviour of the gases reflects the essential difference in their composition, namely the reduction in, or total absence of, excess oxygen. Thus, when a sulphur-containing fuel is burnt in a limited amount of air in order to provide a synthesis gas, a gaseous fuel, coke, or carbon, the resulting flue gases are reducing in nature.

Several workers agree that the sulphur concentration and temperature of exposure are important factors, but there is less agreement concerning the effect of reducing constituents upon the corrosive properties of such gas streams. It has been shown that the presence of free oxygen reduces the scaling of steels by sulphur-containing atmospheres, and also that hydrogen or carbon monoxide has the same effect, although only when present in much larger concentrations. The reaction between sulphur dioxide and free oxygen has been shown to be catalyzed by scales upon steel surfaces, and this has been suggested as a factor in the corrosion sequence.

Discussing the results, the authors point out that it appears to be established that the presence of hydrogen in sulphur dioxide/nitrogen mixtures increases the dry corrosion of mild steel to a serious extent, while the presence of free oxygen has the reverse effect. Whereas under oxidizing conditions the conversion of sulphur dioxide to trioxide prevents sulphide-forming attack above dewpoint, this phenomenon is promoted in reducing atmospheres. It has been suggested that the rapidity of sulphide scale formation is due to the greater mobility of iron ions in the sulphide lattice, and it has been shown that a sulphide scale has a a varying composition, it being considered that the stepped or interrupted type of growth curve may be explained in terms of microcataclysmic phenomena. Despite other evidence concerning the reaction by means of which the corrosion product is produced, a direct reaction between dissociated sulphur dioxide and iron seems most probable. The conversion of sulphur dioxide to trioxide by added or residual oxygen, or supression of this conversion by excess hydrogen, state the authors, would appear to be a satisfactory explanation of the different experience obtained with these two gases.

SUBJECT TO an assurance that the coal will be satisfactory in quality, the Ceylon Government Railway will buy this year 70,000 tons from China. Last year, when China supplied a similar tonnage, the recipients complained that the coal contained a large quantity of dust. The Railway has ordered 70,000 tons of coal from South Africa for 1961 delivery.

MR. T. A. ROGERS

SIX BELLS COLLIERY EXPLOSION

HM Chief Inspector's Report

Ignition of firedamp, caused by the impact of falling rock on steel, is considered to have been the igniting source of the explosion at Six Bells Colliery (Mon) last June. The explosion developed into one of coal dust which spread throughout most of the district, causing the loss of 45 lives. The explosion was the subject of a public inquiry held in September, when 73 witnesses gave evidence. The report of Mr. T. A. Rogers, HM Chief Inspector of Mines and Quarries, into the explosion was published on Wednesday.

FORTY-FIVE men lost their lives as a result of an explosion which occurred at Six Bells Colliery (Mon) on June 28, 1960. Although preliminary examination failed to disclose either an obvious igniting cause or the point of origin of the explosion, Mr. T. A. Rogers, HM Chief Inspector of Mines and Quarries, in his report, considers that an ignition of firedamp, caused by the impact of falling rock, initiated a coal dust explosion which spread throughout most of the district.

Six Bells Colliery is situated some 12 miles north of Newport and, at the time of the explosion, 1,213 men were employed below ground. The explosion occurred in W District of the Old Coal Seam where the workings were about 550 yd. below the surface and there were three longwall conveyor face units known as 0.10, 0.12, and 0.18, situated about a mile from the shafts. The faces were advancing northwards towards old workings from Marine Colliery where a disastrous explosion occurred in another seam in 1927. General experience in the working units had been mainly normal.

The Explosion

The dayshift on June 28 descended in the normal way and at about 10.45 a.m. four men were working on the outskirts of the district when there was a noise and a lot of dust. One was killed, but the three others escaped with only minor injuries. Dust seen in the air at the shafts caused officials of the mine to investigate. They found the main intake airway blocked by a fall of roof and the return airway so fouled with gas as to prevent their entry. Subsequent exploration by rescue workers wearing self-contained breathing apparatus disclosed that none of the 45 men there had survived. The evidence in general, and in particular the known presence of carbon monoxide after the explosion, suggests that the victims lost consciousness rapidly and that death occurred within a few minutes of the explosion.

Preliminary examination failed to disclose either an obvious igniting cause or the point of origin of the explosion. A detailed and prolonged investigation was undertaken by officials of the National Coal Board, inspectors of the National Union of Mineworkers, HM Inspectors of Mines and Quarries, and scientific staff of the Safety in Mines Research Establishment.

Although the circumstances were such as to raise some doubts, the Chief Inspector comes to the conclusion that the most likely point of origin of the explosion was the roadhead of the intake roadway to 0.10 face. The firedamp which was ignited there must, in his view, have accumulated in a period of some hours from small feeders in the vicinity.

The igniting agent was either a hanging flame left by shotfiring or frictional heating from the impact of quartzitic rock falling on steel. Stone had apparently fallen from the roof, which had not been supported after shotfiring on the previous nightshift, on to a steel girder forming part of a canopy used to protect the conveyor during roof-blasting operations. The Chief Inspector decided that, on balance, the latter was the more likely cause.

The 0.18 face was advancing into an area not likely to have been drained of firedamp to any appreciable extent by previous workings; the nearest seam extracted was the upper leaf of the Black Vein, some 60 yd. above the Old Coal Seam. A fairly substantial firedamp emission was therefore to be expected and did, in fact, occur.

When last measured before the explosion, the quantity of air in the return airway was 9,450 cu. ft./min., and it contained 1 per cent. of firedamp at a point 30 ft. from the face. The make of

firedamp was thus about 94 cu. ft./min. Firedamp appearances were quite frequent, mainly in the intake rippings.

The make of firedamp in 0.10 unit was small—less than 17 cu. ft./min. when last calculated before the explosion; the percentage of firedamp at the return end of the face was only ¼ per cent. Nevertheless, firedamp was quite frequently reported by the deputies mainly at or near the return end of the face. Although the Chief Inspector does not subscribe to the view that had a system of firedamp drainage by boreholes over the gob been practised the accident might have been averted, he considers that 0.18 unit was one in which firedamp drainage might well have been adopted.

The results of pre-explosion roadway dust samples at Six Bells Colliery were generally satisfactory, but in spite of this, a widespread explosion occurred. There is evidence which tends to show that in rope haulage roads and walking returns the results of post-explosion samples give a fair guide to the composition of dust in those roads at the time of an explosion. In other roads, notably those where coal is carried by belt conveyor, wide differences may be expected. Before an explosion there may be imperfect mixing of coal and stone dust, a situation particularly likely to arise on conveyor roads where rich deposits of coal dust can easily collect under the conveyors and on the conveyor structures. The deposits of coal dust under the conveyors are by no means easy to sample and this, together with dust from any coal being conveyed, may account for considerable discrepancies in the results of samples collected before and after the explosion.

There was evidence that the roadway conveyors were not kept clean; but cleaning and stone-dusting even to standards which would be regarded as very good practice are, unfortunately, not a complete safeguard against a coal dust explosion. The extent of the explosion might possibly have been much less had barriers been provided.

Conclusions

The Chief Inspector concludes that new methods of work, in themselves advantageous from nearly all points of view, may increase the risk of firedamp ignition and it is necessary to ensure that the changes are matched by the adoption of appropriate precautionary measures against new or increased hazards.

This explosion has emphasized that the ignition of a comparatively small accumulation of firedamp, such as is liable to occur in almost any seam, may in some circumstances cause a disastrous coal dust explosion.

The explosion started as an ignition of firedamp in the roadhead roof ripping of 0.10 intake and the accumulation of the firedamp might have been prevented had there been a hurdle sheet near the face ripping. The fall of rock thought to have ignited the gas might have been prevented had the roof between the last-set steel arch and the new ripping face been supported immediately after the firing of a round of shots about 7-hr. before. An explosion of firedamp alone, states the Chief Inspector, might not have caused any casualties as there was no one in the vicinity at the time. The explosion which spread throughout most of the district was one mainly of coal dust raised on the conveyor roads.

Recommendations

The possibilities that the explosion may not have originated in 0.10 intake roadhead and may have been caused otherwise than by a fall of stone widen the field of recommendation of action designed to reduce the explosion risk. Implementation of some of these suggestions might well necessitate an increase in specialized staff, but the Chief Inspector is convinced that in some fields much more specialized work should be done to help the manager in the discharge of his very onerous responsibility for safety. The Chief Inspector's further recommendations are that:—

(1) The Working Party of the Safety and Health Committee of the Coal Industry National Consultative Council which is to review the general problem of coal dust explosion hazards should consider, as a matter of urgency, what additional precautionary measures could be taken on lengths of conveyor roadways nearest the face and most likely to be affected by a firedamp explosion.

(2) The potential danger of firedamp ignition associated with the fall of certain kinds of rock should be recognized by managements as an additional reason for perfecting measures designed to prevent falls at roadheads and for the maintenance at all times of effective ventilation of roof rippings, cavities, and waste edges.

(3) The ventilation engineering service of the NCB should provide managers with the greatest possible specialist advice and assistance on firedamp drainage by boreholes and on all aspects of ventilation.

(4) The NCB's efforts designed to provide deputies with the best means of examining for firedamp in places out of easy reach should, if possible, be intensified.

(5) All persons engaged in shotfiring should bear in mind that the safe performance of their duties demands meticulous care and managements should lose no opportunity of satisfying themselves that it is being exercised. The nature and form of stemming material best suited to general use and least likely to lead to malpractice should be investigated. Trials of foam injection into ripping shotholes should be encouraged and a wider use of explosives specialists could have many advantages.

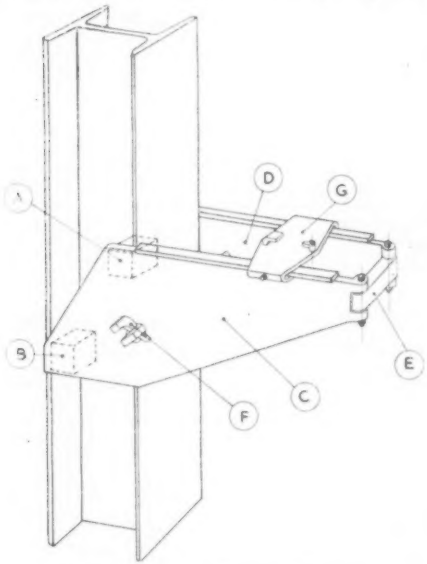
(6) Mining engineers of the NCB and other interested parties in South Wales should give fresh consideration to ways and means of reducing the incidence of large cavities on roadheads and of dealing safely with any which occur.

(7) The Ministry of Power should review with interested parties the use below ground of air ejectors.

"Bretby" Girder Bracket

DESIGNED at the National Coal Board's Central Engineering Establishment at Stanhope Bretby is a bracket to carry rails which are to be mounted on the side members of steel arches in underground roadways. It was originally designed to support the rails on which a carriage carrying boom-mounted rock drills could travel, leaving sufficient clearance for loading machines of the gathering-arm type to pass beneath the carriage, but it will have a much wider application.

The "Bretby" girder bracket may be attached to the straight portion of an arch at any height above



THE "BRETBY" GIRDER BRACKET.

the ground and is locked in position by means of a wedge. It is therefore independent of the floor, so that adjusting or dismantling cannot be hindered by debris, etc., and it is easy to release. The weight is taken by four blocks (two of which are seen at A and B on the accompanying sketch) integral with the bracket, which locate on the inside of the flanges of the arch section. The upper blocks act on the inner (roadway) side of the arch section and the lower blocks react against the outer flange, so that the load locks them against the arch and the self-locking action increases with the load.

The bracket has two outer load-bearing members (C and D) joined by a link (E) forming a double hinge. The outer members are closed on to the arch section with the blocks inside the flanges and secured by means of the tapered wedge (F). Adjustments in height can be made after simply raising the front of the bracket. A saddle (G), to which rails can be clamped, is mounted on top of the bracket. This saddle can be moved horizontally to make any adjustments in alignment to allow for ground movement and irregular arch setting.

Tests on prototypes of this bracket have shown that it will not slip however heavily loaded and that it is strong enough to support a load of at least 5 tons.

History of the Fuel Research Station

IN 1917 the Department of Scientific and Industrial Research appointed a Fuel Research Board "to investigate in the broad national interest the nature, preparation, utilization, and treatment of coals and other fuels, and of products derived from fuels." In the following year the Fuel Research Station was established at Greenwich. Some 40 years later, in 1958, the Research Council considered that, in view of many developments in the fuel world, the Fuel Research Station had completed its work and should be closed down. A review of the work of the Fuel Research Organization from 1917 to 1958, recently published, summarizes the achievements of the station.

The main sections deal with basic aspects of fuel research including fuel analysis, carbonization, preparation of coal for the market, gasification of coal and coke, coal constitution, combustion and steam raising, hydrogenation of coal and coal tar, the Fischer-Tropsch synthesis, atmospheric pollution, and domestic heating. There is an important section on the coal survey laboratories.

All of this provided the main basis of the station's research throughout its existence, but priorities altered continuously to meet changing needs. During the 1939-45 war the emphasis naturally changed radically and it is a striking measure of the versatility of the station that it became deeply involved in such activities as camouflage by smoke and coal dust, production of flame thrower fuels and other incendiaries, mobile producer-gas units, and the use of liquid methane as a fuel for motor vehicles. Post-war investigations included studies of orchard heating, the combustion of flax shives, the flow properties of residual fuel oils, and the pollution of the sea by oil. The review presents in summary form information which might otherwise be difficult to locate, and includes 151 references to the papers of the station.

In addition to its own research work the Fuel Research Station made an impressive contribution to the industry through members of the staff, who, having gained part of their experience at the station, moved to positions of distinction outside. The review, "Fuel Research, 1917-1958," is edited by Dr. A. C. Monkhouse, formerly deputy director. It is published for DSIR by the Stationery Office, price 15s., by post 15s. 8d.

Australian Appointment for George Cohen Branch Manager

FOLLOWING 31 years' service with George Cohen, Sons & Company, Limited, Mr. B. A. Thurgood has been appointed resident director of George Cohen Australian Scrap Company (Pty), Limited, Sydney, the company formed towards the end of last year by the George Cohen 600 Group, Limited. Mr. Thurgood, who, until recently, was the firm's branch manager in Morriston, Swansea, (South Wales), has already left to take up his new position in Australia.

MR. B. A. THURGOOD

Mr. Thurgood joined Cohen's at the company's head office in London, in September, 1929. In March, 1946, while still at the head office, he was transferred to the scrap metal side of the business and in the following July he moved to Bath as raw materials area representative. Three years later, Mr. Thurgood was appointed manager for raw materials, Morriston. In 1955 he became manager of the Morriston depot, taking over the machinery section as well as raw materials.

Mr. Thurgood is a member of the group's 25 Club —for those with 25 or more years' service.

Average Weekly Pay in British Industry

AVERAGE weekly earnings of men in British industry in October was £14 10s. 8d., according to the Ministry of Labour's half-yearly survey. This represents an increase of 3 per cent. in the six months since the previous inquiry in April, 1960, and an increase over the full year from October, 1959. The increase since April, 1956, has been 23.4 per cent. In the manufacturing industries alone, the average weekly earnings figure for October was £15 3s. 3d. Average weekly hours worked were 48 in October, the same as in April, and compared with 48.5 in October, 1959, and 48.6 in April, 1956.

Monthly figures issued by the Ministry show that on January 16, unemployment stood at a level of 1.9 per cent, compared with 1.6 per cent. in December, 1960, and 2.1 per cent. in January, 1960. The total number out of work was 418,095, of whom 359,102 were wholly unemployed and 58,993 temporarily stopped.

There were more stoppages of work due to industrial disputes last year than in 1959, but the number of working days lost was fewer, according to provisional figures given in the Ministry of Labour Gazette. The number of stoppages was 2,814, compared with 2,105 in 1959. The 1960 stoppages resulted in the loss of about 3,008,000 working days compared with 5,270,000 lost during 1959. The number of workers involved was about 811,000, compared with 646,000 in 1959.

Employers' Aid Needed in Sickness Inquiry

RESULTS of an inquiry into the causes and extent of sickness among employees in Britain will provide research workers with a picture of the distribution of illness in the working community and the effect of occupation and environment on health. The inquiry was announced by Mr. John Boyd-Carpenter, Minister of Pensions and National Insurance, on Monday.

It will be based on claims for sickness benefit during the year beginning June 5, 1961, among a representative sample of 5 per cent. of employed men and 2½ per cent. of insured employed women, covering in all 800,000 employees. Inquiry forms, which employers will be invited to complete, will ask two questions—a description of the occupation of the employee and whether any payment is made by the employer when the employee is away ill.

Further details of employers' sick pay schemes will afterwards be sought for the 10 per cent. of the employees in the sample who are found to be covered by such schemes. No information regarding individuals or employment in a particular firm will be disclosed outside the Ministry.

It is hoped that the inquiry will help to determine the causes of bronchitis, psycho-neurosis and psychosis, rheumatism, and arthritis, to which more than a quarter of all incapacity for work is attributed. Every year 6,000,000 of the 20,000,000 people insured for sickness benefit, claim for one or more absences from work because of illness of injury. The cost was about £130,000,000 last year.

AUSTRIA REACHES NEW STEEL PRODUCTION RECORDS

AUSTRIAN steel production last year passed the 3,000,000-metric ton level for the first time. This means that *per capita* steel production in Austria is now higher than that for the Soviet Union. Both production and turnover of the country's steel industry rose by some 20 per cent. over the 1959 totals.

Of the total output, Vereinigte Oesterreichische Eisen und Stahlwerke (VOEST), of Linz, produced 1,800,000 tons of raw steel and 1,200,000 tons of rolled steel, while a further output of over 1,000,000 tons was recorded by Oesterreichisch-Alpine Montangesellschaft. The former concern has plans to expand its annual steel capacity by a further 500,000 tons.

New Steel Plant for Uganda

SITE has been chosen for the steel plant to be built at Jinja, Uganda, reports Barclays Bank, DCO. A company has been incorporated under the title of the Steel Corporation of East Africa, Limited, and work is expected to begin on the building of the plant early this year. The machinery for the venture has been ordered from Italy.

It is planned to use 30,000 tons of scrap metal a year initially, to give an output of about 27,000 tons of steel products including reinforcing bars and iron hoops.

Mr. A. MOFFATT, who before his retirement had been traffic manager at Spen and Chopwell collieries (Co. Durham), has died aged 89.

Belgian Coal Industry

FURTHER PRODUCTION CUTS PLANNED

CLOSURES of Belgian pits in 1959 under the reorganization scheme accounted for a total capacity of 2,500,000 metric tons, and during 1960 for 2,470,000 tons, making 4,970,000 tons in all, says a report on the Belgian coal problem issued by the High Authority of the European Coal and Steel Community. The report describes past measures to assist and integrate the Belgian coal industry into the European market, and goes on to describe the position as it now exists.

In October, 1960, the Conseil National des Charbonnages, the Belgian national coal-mining authority, decided that in 1961 certain collieries in the coalfields of Southern Belgium, representing a production capacity of 1,750,000 tons, should be closed down, stating at the same time that the aggregate capacity of the industry would need to be cut by 2,000,000 tons in all during 1961 if it was to be brought into line by the end of 1963 with estimated marketing potential.

The Council of Ministers of ECSC, meeting in Luxembourg in November, again examined the problem of the Belgian collieries, following the Belgian Government's request for authorization to grant subsidies amounting to Bfr. 400,000,000 in 1961, and for the introduction of special measures to safeguard its market under Article 37 of the Treaty.

Financial Steps Taken

The subsidies proposed were on a descending scale, and the Belgian Government has undertaken that they shall go down from the 1960 figure of Bfr. 680,000,000 on 4,100,000 tons, as follows: 1961, Bfr. 400,000,000, on 3,200,000 tons (estimated); 1962, Bfr. 200,000,000; 1963, Bfr. 100,000,000; after 1963, nil.

The report says that over and above its compensation scheme, and participation in the reorganization plan for the Borinage during the transition period, the High Authority has taken various financial steps to facilitate the adjustment and reconstruction of the Belgian coal-mining industry. These were in the main measures to assist the readaption of workers affected, and secondly, measures to reduce the crisis.

By June 30, 1960, the High Authority had committed a total of 6,400,000 units of account for paying special allowances to miners placed on collective short time in Belgium, and assistance to Belgian collieries since the end of 1958 to help finance the holding of accumulated pithead stocks works out at 1,000,000 units of account (non-repayable). With regard to readaption, the High Authority has set aside 10,560,000 units of account on the assumption that it may be necessary to tide over or retrain a maximum of 38,900 Belgian workers.

Stating that the question now arises whether these measures taken under Article 37 should be continued, the report states that the High Authority recognizes that "it is still necessary to keep trade within such limits as will enable the programme of closures to be carried through without too many social complications," but it considers that these restrictions should taper off as time goes on, and that by January 1, 1961, a first step should be made in this direction.

The Authority considers that "the main thing is that conditions should be established as soon as possible to enable the implementation of Article 37 to be dispensed with and the normal operation of the Common Market to be restored." This presupposes that the reorganization scheme of December, 1959, will be carried out with reasonable speed in accordance with the practical arrangements approved by the Belgian Government.

"Ordered, rational reorganization in due conformity with Community rules, progressive easing of the special measures introduced under Article 37, a flow of Community assistance for readaption and redevelopment, and the gradual restoration of normal conditions *vis-à-vis* the rest of the Common Market, are the present main lines of the High Authority's action in respect of the Belgian coal-mining industry," the report concludes.

Anthracite Seams found in the Antarctic

RICH deposit of high-grade coal has been discovered in mountains 90 miles from McMurdo Sound, Antarctica, it is reported, and it believed to be the largest find ever made in the continent. Mr. John Mulligan, a geologist from the United States geological survey, returned from a field trip to Mount Gran, north of the Mackay glacier, with nearly 300 lb. of anthracite from 12 seams of coal found at an altitude of 6,000 ft. Most of the seams were 1 ft. and 2 ft. thick, but two were 7 ft. and 8 ft.

Coal found in the continent in the past has been of low grade, and discoveries of anthracite last year in the Horlick mountains and near the Beardmore glacier do not appear to rival the new seams. Although the coal is of the same quality as the commonly used fuel, its commercial exploitation in the foreseeable future is thought to be unlikely as the cost of exporting would be prohibitive, and most installations in the Antarctic are using oil for fuel.

Housing Estate Planned on Pit Site

WHEN its coal reserves run out in six months' time Wilkin Colliery (Staffs) is to close, Mr. J. G. Langley, appearing for the colliery, told a public inquiry at Brownhills last week. He was opposing a compulsory purchase order by Brownhills Urban District Council, which wants the colliery land for housing development.

It would be better, Mr. Langley maintained, to wait until the colliery closed when the pit heaps could be levelled off, rather than to risk turning the land into a derelict area.

Coalfield News

10-Year-Old Dispute to be Resolved

OLD-STYLE lamp still carried by one miner in eight as a gas warning device is the subject of a dispute in the Leicestershire coalfield. The National Union of Mineworkers wants a special payment for the men who carry it, but the National Coal Board disagrees.

After negotiations which have been carried on over the past 10 years, both sides have agreed that a County Court judge, sitting as an industrial umpire, shall decide the issue.

ELECTRICAL ENGINEER at Rossington Colliery (Yorks), since 1922, Mr. R. P. Bartlett has retired after spending his life in the coal industry.

Mr. B. GODDARD, an official of the National Union of Mineworkers at Houghton Main Colliery (Yorks), has been elected NUM Area agent in succession to the late Mr. J. Stone.

AFTER 51 years at Deaf Hill Colliery (Co. Durham), Mr. Daniel McGlen has retired. Since 1935 he had been foreshift overman.

OFFICES of the Cumnock group of collieries in the East Ayr Area of the Scottish Divisional Coal Board closed last Friday. The staff has transferred to Area headquarters at Lugar.

TESTIMONIAL of the Royal Humane Society has been awarded to Mr. John Taylor, 34-year-old miner, of West Wemyss (Fife), for rescuing a three-year-old boy who fell into a dock.

SCARBOROUGH BRANCH of the RSPCA has applied for four pit ponies from Broomhill Colliery (Northumberland), which is closing down. Eight of th ponies, which are old, were to be destroyed.

FOURTEEN MINERS were injured, none seriously, at Polquhairn No. 4 Colliery, West Ayr, when three bogies carrying them to the surface careered 1,000 ft. down a steep haulage road after a cable snapped.

GORDON HOUSE COLLIERY, Cockfield (Co. Durham), will be closed shortly. Of the 100 men employed there, 80 have been offered work at nearby pits. The remainder will become redundant.

WEEKLY coal shipment figures from Blyth (Northumberland), last week reached their highest level in the port's history. Over 90 ships carrying 170,378 tons of coal left the port, beating the previous best figure in December by over 6,000 tons.

AN INQUEST JURY at Pontefract (Yorks) last week returned a verdict of Misadventure on Mr. Anthony Gomolczak, a shaft sinker, who was killed when a heavy mechanical pick fell on his head while he was working at the bottom of a 1,377 ft. shaft at the new colliery at Kellingley.

MINERS AT Stanley Colliery, near Ilkeston (Derbyshire), which is to be closed this summer as uneconomic, set up a new production record last week of 52.3 cwt. per manshift. The NCB has rejected the miners' protest against the closure, after repeated unsuccessful attempts to drive new shafts into the new seams.

OVER 200 brass band players from all parts of the country took part in the Creswell Colliery Band slow melody quartet contest last Saturday. Grimethorpe "A." which won the open quartet contest last year could not defend its title because of influenza. The open quartet was won by Grimethorpe Trombones and the junior quartet by Teversal Colliery.

ACCIDENT RATE in the No. 6 (North-West Durham) Area of the Durham Divisional Coal Board had been reduced by 30 per cent. in the past two years, said Mr. A. Williams, Area production manager, at a recent presentation of prizes in the safety competition. Mr. C. Coulson, manager of "B" Group, said that the wearing of safety helmets and boots should be made compulsory.

AT A SCOTTISH miners' delegate conference in Edinburgh on Monday, a call was made to Lanarkshire miners to "resist through all channels" a decision of Lanarkshire County Council to continue installing oil heating systems in new schools. Mr. Abe Moffat, the Area president, said the decision was taken by a Labour-controlled council, many of whom were ex-miners and some working miners.

APPEAL FOR £10,000 for the renovation of the miners' Rest Convalescent Home, Porthcawl, has nearly reached the £5,000 mark, and the total amount is expected to be reached by the end of this year, said Mr. G. Phillips, industrial relations officer for the Monmouthshire Area of the South Western Divisional Coal Board, on Saturday. The money is to be used to modernize the 100-year-old home.

IT SHOULD BE the motto of each deputy that survival was a matter of eternal vigilance, Mr. W. S. Hutton, manager of Sherburn Hill Colliery (Co. Durham), told members of the pit's deputies association last week. From a safety point of view, he said, Sherburn Hill came top in the Safety in Mines League, and only Easington Colliery beat it for tidiness. Presentations were made to two deputies, Mr. J. W. Coates and Mr. W. L. Marley, on their retirement.

Mr. L. Atkinson Retires After 50 Years in Coal

WELL-KNOWN figure in the mining industry in the north of England, Mr. L. Atkinson has retired after nearly 50 years in the industry. He is vice-president of the National Association of Colliery Managers and of the North of England Institute of Mining and Mechanical Engineers.

MR. L. ATKINSON

Mr. Atkinson began his career in the ironstone mines of his native Cumberland, but soon transferred to coal mining, joining the Cramlington Coal Company, Limited, in Northumberland, where he became head surveyor. He continued in this position after the amalgamation of the Cramlington and Seaton Delaval groups of collieries, and after the formation of the Hartley Main Collieries, Limited.

Subsequently, Mr. Atkinson became assistant manager of the Princess Royal Colliery, Forest of Dean. He was manager of the Choppington "B" Pit, Backworth Fenwick Pit, and Maude and Eccles collieries, and then, in 1945, he was appointed assistant agent to the Backworth group. Six years later he joined the headquarters staff of the Northern (N&C) Divisional Coal Board, as divisional mine planner. From 1953-54 he served as president of the north of England branch of the NACM.

THE COAL TRADE

CROP of stories of a famine in household coal which are current at the moment probably seem a little highly coloured to those who have to deal in this commodity, but it cannot be denied that for one reason or another, things are difficult just at the time when the merchant would like to be able to give top-grade service and so play his part in the battle for solid fuel. The report that a shipment of 400 tons of Irish anthracite has been distributed among merchants in the Glasgow, Paisley and neighbouring areas is a sufficient comment on the strangeness of the times.

LEICESTERSHIRE

House coal of all types is insufficient to meet the present heavy demand. Most depots are short of all the main groups and have eaten heavily into their stocks. Small quantities of ungrouped open-cast coal have been delivered to some depots and this has helped the bagging trade. Rail deliveries of the premium smokeless fuels are subject to considerable delays and the waiting lists for these fuels are growing steadily.

Supplies of best anthracite, always a sore point with merchants, are now worse than ever and inferior grades have to be accepted under the small anthracite supply scheme to keep customers going. Some relief to this particular situation is afforded by Phurnacite which continues to be readily available and which is an acceptable substitute in many cases.

Supplies of coke are coming through satisfactorily which enables the strong demand from the central heating market be met promptly. In the industrial sector, all grades of doubles, DS nuts, singles, and washed smalls are available under programme, but there are still delays at supply points. The larger consumers are lifting their stocks to a large degree—a feature which the trade is watching carefully in view of the tightness of the supply position at the moment.

Fife Pit to Develop Seams Under the Forth

SITUATED on the Firth of Forth, near Culross (Fife), Valleyfield Colliery is being completely reconstructed. One entirely new shaft is to be sunk to a depth of 800 yds., and another is being deepened from 430 to 770 yds. These will enable the colliery to develop coal lying in the deeper part of the field beneath the Forth. It is hoped that the Valleyfield operation will yield coal of good coking properties, similar to that of Kinneil Colliery on the opposite side of the Forth. If this is successful, Valleyfield will be the first Fife pit to produce this class of coal.

Record weekly output of 5,430 tons was recently obtained by the colliery, together with the higher o.m.s. of 22.4 cwt. Mr. Norman Wallace, colliery manager, said: "We are now breaking records that have stood since 1954. This has been achieved, without a doubt, through the spirit among the workmen, and their co-operation with management." Mechanization had played a large part in the increase in production, about 75 per cent. of the total output of the pit, now in the region of 1,100 tons a day, being obtained in this way.

Nearly half of the record output came from Blairhall Main shearer section, where the 24 faceworkers draped their machine with the Union Jack when the record was announced.

Coal Used—and Coal Won

TOTAL coal consumption for the first three weeks of the year, including exports, was 14,277,000 tons, compared with 13,879,000 tons in the corresponding weeks of 1960. Total output for the three weeks, however, was only 11,172,400 tons, a drop of over 1,000,000 tons on a year ago.

Small wonder, then, that there was another considerable drop in pithead stocks—from 28,141,000 tons to 27,517,000 tons. By January 21 merchants had 1.4 (1.2) weeks' normal consumption in stock.

There were 583,360 wage-earners on colliery books on January 21, against 630,910 on January 23, 1960, the numbers engaged at the coal face being 219,940 and 241,470 respectively. Total absenteeism (all workers) in the week ended January 21, was 15.46 per cent., compared with 14.79 per cent. in the week ended January 23, 1950. Output at the face was 4,075 tons and overall 1,429 tons in the week ended January 21, compared with 3,887 and 1,386 tons in the week ended January 23.

The following table gives (in tons) the revised output of saleable mined coal by division in the week ended January 28, and the tonnage lost through all causes (holidays, disputes and go-slows):—

Division.	Week ended January 28, 1961.		Week ended January 30, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish	358,000	3,000	380,000
Northern (NAC)	247,000	—	243,000
Durham	468,000	—	477,000
North-Eastern	802,000	13,000	844,000
North-Western	244,000	4,000	279,000
East Midlands	872,000	4,000	919,000
West Midlands	278,000	1,000	295,000
South-Western	380,000	7,000	416,000
South-Eastern	33,000	—	35,000
Great Britain—			
Deep-mined coal	3,682,000	32,000	3,888,000
Other deep-mined (including licensed mines)	42,000	—	54,000
Open-cast coal	157,000	—	145,000
TOTAL	3,881,000	32,000	4,087,000

NEW COMPANY. V. W. F. Simon, NV, has been formed by Henry Simon, Limited, a member of the Simon Engineering, Limited, group and United Van der Wal Factories, NV, of Holland, to supply equipment to the corrugated container industry in the Common Market countries. The new concern, under the direction of Mr. W. Van der Wal, Mr. O. Van der Wal, and Mr. C. G. Ahlquist, will manufacture Simon-Hooper machines in a factory in Amsterdam.

NEWS IN BRIEF

TELEPHONE NUMBER of Simms Motor Units, Limited, is now FINchley 2692.

CAPITAL of Sandvik Steel Works, Sweden, is to be increased from 83,000,000 kr. to 110,670,000 kr. by the issue of one new share for very three held at a price of 150 kr.

PARKFIELD FOUNDRIES (TEES-SIDE), LIMITED, has been registered as a private company with a capital of £100,000, to make precision castings in high-duty iron and non-ferrous metals.

ERECTION HAS BEGUN at the iron and steel works at Ostrava, in the Moravian region of Czechoslovakia, of an oxygen converter—the first LD process steel equipment to be used in the country.

EXPLORATION of certain areas in the Leinster (Eire), coalfield is to be extended to establish the size and value of the deposits. Kilkenny, Laoghis, and Carlow will be included in the extended survey.

WAYNE KERR LABORATORIES, LIMITED, has reached the final stages in negotiations for a licensing arrangement with Gertsch Products Inc., precision electronic instrument manufacturers, of Los Angeles, USA.

LIBERIAN VESSEL Ore Regent arrived at Tyne Dock on Wednesday with a 30,667-ton iron ore cargo from Venezuela—a tonnage just 198 tons short of the record cargo discharged at the dock last year by the sister ship Ore Prince.

IN ASSOCIATION WITH the Gas Integrale group of companies, the International Furnace Equipment Company, Limited, of Aldridge (Staffs), has acquired rights to build the Gaz de France "P 9" gasification plant in Britain and the Commonwealth countries.

APPRENTICES of George Kent, Limited, received awards from the chairman, Comdr. P. W. Kent, at the company's annual apprentice prize-giving last week. Guest speaker for the occasion was Mr. W. F. Stephenson, principal of Luton College of Technology.

PRICING AGREEMENTS relating to agricultural machinery, cables, radio valves and television tubes, bricks, coal, precast concrete products, sand and gravel, and tools, have been brought to an end, the Registrar of Restrictive Trading Agreements reports.

NEW COMPANY, Expert Industrial Controls, Limited, has been formed to bring together under one name two established members of the Expert Tool & Case Hardening Company, Limited, group—Sharp Control Gear, Limited, and Electram Coil Winding & Transformer Company, Limited.

NEW RESEARCH CENTRE for the Cementation, Limited, group was opened last week at Maple Cross, near Rickmansworth. The work of the centre is divided into four main sections—civil engineering, mechanical engineering, physics, and chemistry. Dr. R. A. Scott is in charge of the centre.

SEA COAL-BORING TOWER, used by the National Coal Board to explore seams under the Firth of Forth, is being broken up for scrap by James N. Connell, Limited, Coatbridge. All that remains of the £150,000 tower are the tubular steel legs in the Forth, which are soon to be demolished.

AMONG EQUIPMENTS recently ordered from Wild-Barfield Electric Furnaces, Limited, by Belgian customers are gas carburizing installations, a large mesh belt conveyor furnace, and a miscellany of muffles, small furnaces, and salt baths, many of which are for use in technical education establishments.

A REGISTER OF DIRECTORS of exporting firms willing to offer assistance to non-competing companies will be compiled by the Export Action Now Committee as a result of a personal invitation sent out on Wednesday by the director-general of the Institute of Directors, Sir Richard Powell, to the institute's 36,000 members.

NEGOTIATIONS HAVE BEEN completed for the range of pumps made by Gebr. Stork, NV, of Holland, to be manufactured in Greenock by Rankin & Blackmore Limited. Sales in Britain will be undertaken by Smail Sons & Company, Limited, engineers' agents, of Glasgow.

ASPECTS OF economic development in Africa will be considered by the UN Economic Commission for Africa (ECA) at its third session opening in Addis Ababa on Monday. The commission will examine economic trends, measures to promote international and intra-Africa trade, financial and technical assistance, and co-operation in transport and industries.

ABOUT 700 of the 3,300 workers at the three plants of Metropolitan-Cammell Carriage & Wagon Company, Limited, in Birmingham and Wednesbury (Staffs), may become redundant in three months because of a fall in orders for the industry. The remainder may have to be put on short time. There has already been some dismissals and short-time working.

MANUFACTURING licence to produce Massey-Ferguson diesel tractors in India has been issued to Tractors & Farm Equipment (Private), Limited, Madras, by Massey-Ferguson, Limited, which has a substantial minority interest in the newly-formed company. Initial production will be of 3,500 tractors yearly, and plans call for almost complete indigenous production after two to three years.

FURTHER 2,000 MEN at the Port Talbot works of the Steel Company of Wales, Limited, went on to a shorter working week last Friday, because of the motor car recession. Production men in the finishing mills will lose an average of four hours a week. Maintenance men are to lose an average of two hours a week. For three weeks, 1,250 men in the hot rolling mills have been working reduced hours.

THE NEW graduated pension scheme, which starts in April, is explained in a short leaflet, N.I.122, now available at local Pensions and National Insurance Offices and at post offices. Bulk supplies of the leaflet are available to employers, for distribution to employees, on application to the Ministry of Pensions and National Insurance, Department "P," 10, John Adam Street, London, W.C.2.

ACTIVITIES OF THE Metal Industries Group, Limited, are being extended to the West Indies. Its wholly-owned subsidiary, Dynamo & Motor Repairs, Limited, of Wembley (Middx), is joining with the Kingston Works, Limited, of Kingston, Jamaica, in the formation of a new company, K.I.W. Dynamo Motors, Limited. The company will provide a service for the rewinding and repair of motors and other electrical plant in Jamaica and other West Indies islands.

JOINT MARKETING ARRANGEMENT has been made between the Rheostatic Company, Limited, and Black Automatic Controls, Limited, both members of the Elliott Automation, Limited group. Rheostatic is to sell the range of Black solenoid-operated valves, pressure, and flow switches to the heating, ventilating, and air-conditioning industries under the name Black-Satchwell alongside its range of Satchwell controls. A sales office is to be opened in London by Black Automatic Controls with Mr. H. G. Higginson as general sales manager.

COAL STILL LEADS

As World Source of Energy

COAL will remain for a long time to come the most important source of energy and primary product in the modern economy, despite the appearance of new sources of energy on a large scale. This view is among the conclusions adopted by the Tripartite Technical Meeting convened by the International Labour Organization to consider the "social consequences of the coal crisis," which ended in Geneva on Thursday of last week.

The meeting felt that "the current state of crisis, despite its seriousness, in no way implies that the existence of the coal-mining industry, even in the more distant future, may be in question. The attention of governments should, however, be drawn to the paramount need to promote, in each country concerned, a policy to enable the industry to maintain an essential position within each national economy."

Having declared that the present crisis constitutes for the industry "a real era of transition," the meeting considered it essential for the industry and for each of the producing countries to ensure that the emergency measures which have been or may still be taken to reduce production by means of lower levels of employment should not, in any way, damage the "substance" of the coal-mining industry, *i.e.* its manpower—from the labourer to the engineer—and all the other elements which ensure its productive capacity.

National Fuel Policies Needed

The meeting enumerated a series of measures, some temporary, and others of a permanent character, which might be taken into consideration in view of the particular conditions prevailing in different countries and in different mining undertakings.

Particular efforts, it thought, should be undertaken to maintain the coal-mining industry as one of the essential elements of each national economy, both as a producer of a source of energy and as a producer of a raw material for new industries or new techniques. In those countries where the need was apparent, effort should proceed to an internal reorganization of the industry, by revising its means and possibilities, adjusting its programmes and improving its internal and external methods of organization.

The meeting urged the pursuit of co-ordinated national fuel policies, in order to establish the best balance between the coal industry and other sources of energy, and to enable the industry to adapt itself smoothly to the development of other forms of energy. National fuel policies should be completed, including the co-ordination of various forms of energy, in co-operation with the regional and international bodies competent in the field. Where the need arose, the assistance of authorities should be sought to enable the industry to settle the acute social problems it faced, and at the same time to increase its efficiency and improve its productivity to withstand the competition of other forms of energy.

It was emphasized that in the present "period of profound change in the industry," research work in all sectors and the exchange of information was of paramount importance.

"Shock" Needed in Coal Industry

"WE need to be shocked back to reality and to the realization that we have a vested interest in the success of our industry," Mr. J. McHugh, chairman, told members of the Leicestershire and South Derbyshire Under Officials Mining Society recently. "The only way to success is through co-operation from both sides," he said. "It must come through the joint pursuit of objectives. It must take on the character almost of a crusade."

With regard to young officials who were taking the first step on the management ladder, he said that it was the society's intention not only to improve their technical knowledge, but to fortify them with the knowledge of how to meet any dispute at the source.

Mr. McHugh was speaking at the third annual dinner of the society. Other speakers included Mr. A. A. Bowker, production director of the East Midlands Divisional Coal Board, and Mr. J. A. W. Mills, a director of Dowty Mining Equipment, Limited.

South Wales Miners Vote Against Wage Offer

ALTHOUGH Scottish miners' delegates and those in the Yorkshire Area have agreed to accept the National Coal Board's wage increase offer of 15s. a week for craftsmen and 8s. 6d. a week for underground and surface workers, South Wales miners appear to be solidly against the proposals.

At Cardiff on Monday, 150 delegates, representing 80,000 of their mining colleagues, unanimously rejected the suggested increases which the board made a fortnight ago.

At the South Wales Area conference of the National Union of Mineworkers, Mr. Will Whitehead, the Area president, said he did not consider that the offer was going to attract men to the industry and thought the minima still too low. "No man should work at the surface for less than £10 a week or underground for less than £11," he added. Colliery lodges meet this weekend to receive the recommendations of the conference.

A threat of strike action by Welsh miners if Britain imports coal, was also announced. Mr. Whitehead said, "Pay the men properly and they will get all the miners they want and all the domestic coal they want."

The council of the Northumberland Area of the NUM decided last Saturday to recommend acceptance of the wage offer.

Changes in Board of General Electric

DIRECTOR for finance and administration of the General Electric Company, Limited, since 1959, Mr. T. B. O. Kerr has been appointed deputy managing director. He is succeeded as financial director by Mr. E. H. Davison, who takes up his duties on March 1.

MR. T. B. O. KERR

Mr. Kerr, who was educated at Uppingham, and Wadham College, Oxford, joined GEC in 1930 as a commercial trainee. After holding various posts in the company, he was appointed personal assistant to Dr. H. Railing—later Sir Harry Railing, a former GEC chairman—in 1934, occupying the post for 13 years. In 1947 he became assistant secretary and two years later secretary. He joined the board in 1952 and was made director for finance and administration in 1959.

Mr. Davison was educated at Dulwich College and qualified as a chartered accountant in 1927. He had held posts with Electrical and Musical Industries, Limited, Turner Bros. Asbestos Company, Limited, and Courtaulds, Limited.

To strengthen the management, other appointments are being planned. A management committee has been formed, the members of which are:—Mr. Arnold Lindley, chairman of GEC, Mr. Kerr, Mr. Davison, Mr. O. W. Humphreys, and Mr. R. N. Millar.

Mr. Humphreys, the director of the Hirst Research Centre, joined the staff of the GEC research laboratories in 1925, became director of the research laboratories in 1949, and joined the board in 1953. He is vice-president of the Institution of Electrical Engineers.

Mr. Millar, after an apprenticeship at the Erith works of GEC, served the company in South Africa and Australia. In 1954 he became manager of the GEC-Simon-Carves Atomic Energy Group, and in 1957 was appointed assistant general manager of the Erith works, becoming general manager a year later. He became a director of GEC in 1959, and managing director of the engineering group in 1960.

Group Loss by Millspaugh, but Order-book Improves

GROUP loss of £40,768 in the year ended October 1, 1960, against a previous profit of £206,397, was incurred by Millspaugh, Limited, makers of non-ferrous castings and paper-making machinery, of Sheffield, which is controlled by Hadfields, Limited, Sheffield. There was a net loss of £23,469 (£111,686 profit), after tax of £1,340 (£126,395), and the dividend is cut to 5 (12½) per cent.

Mr. H. Humphries, chairman, states that the results reflect a period of reduced activity in the group due to lower levels of orders placed by papermaking and other industries which persisted well into 1959. Apart from Canada, conditions showed a substantial improvement in the later months of 1960 and the order-book now stands at a very satisfactory level.

Law Cases

FAULTY EQUIPMENT COST NCB £2,800

JURY sitting with Lord Johnston in the Court of Session awarded damages of £2,800 to Mr. George Neil (37), a miner, against the National Coal Board. Mr. Neil claimed that an electric boring machine failed to stop when he released pressure on the trigger and he was struck in the chest by the borer and suffered injuries to his lungs.

The injury made it impossible for him to do heavy work and he claimed that the board had failed to supply reasonably safe plant and equipment. The board denied liability.

Alleged to have admitted to the police that he had stolen scrap metal worth £30,000 from Henry Wiggin & Company, Limited, Smethwick, Patrick Joseph Shortland (28) was remanded at Birmingham Magistrates' Court on two charges of stealing scrap nickel anodes, of a total value of £1,175. James Thomas Broadhurst (24) was also remanded on a charge of receiving stolen metal. Bail was refused.

PROSECUTION, the first in Stockton-on-Tees under the Noise Abatement Act, was brought against the Quayside Engineering Company, Limited. It was dismissed. Three residents near the works claimed that they were kept awake at night by noise, but under cross-examination two of the plaintiffs admitted that the noise was no louder than a motor car engine and that another works, a quarter of a mile away, made more noise than Quayside Engineering.

Qualcast Fulfils Budget Despite Lower Profit Margins

WITH the very large fluctuations in fortunes at present being experienced in some of the country's basic industries, the diversification policy of Qualcast, Limited, light repetition engineers and ironfounders, etc., of Derby, "without a doubt is proving a success," states the chairman, Mr. V. Jobson. Turnover in the six months to December 31, 1960, was ahead of the corresponding 1959 period, but margins were lower. Even so, Mr. Jobson reports, the trading surplus was within 1 per cent. of the budgeted figure.

The new foundry plant is now operating "moderately satisfactorily" on one shift and is just breaking even. Certain re-equipment which will improve it will be completed by April or May. Mr. Jobson reports that costs continue to rise—the engineering pay rise alone will cost the company over £80,000 a year—but he cannot agree that the future is as grim as some forecast.

WESTINGHOUSE BRAKE & SIGNAL COMPANY, LIMITED—In present market conditions, and in view of the effect of the initial stages of manufacture of new products, profits for the current year may be lower than in the year ended October 1, 1960. Mr. A. R. S. Nutting, chairman, says the plans made to produce the Hobbs automatic gearbox in quantity at the right price will involve heavy capital expenditure, but he is confident this diversification of group activities will be a "great source of strength" in the future. He also expresses his confidence that the demand for railway braking, signalling, and colliery equipments will remain at a high level for some time, and that the large capital investment in the expanding rectifier business will continue to yield a good return.

Company Statement

COLVILLES LIMITED

Expected Increase in Demand for Steel Realised

BENEFIT OF IMPROVED PRODUCTION FACILITIES

Trading Profit a Record

SATISFACTORY RESULTS AT RAVENSCRAIG

Sir Andrew McCance Reviews Past Year's Activities

THE 30th annual general meeting of Colvilles Limited is being held today (Friday) at Glasgow.

The following is the circulated statement by SIR ANDREW MCCANCE, D.Sc., LL.D., F.R.S., D.L., chairman and managing director, for the year to September 30, 1960:—

By the end of the last financial year in September 1959, it became clear that confidence was returning and that business was moving, bringing with it a rapid increase in the demand for steel. Our experience has confirmed the best expectations we had formed and all sections of the plant have been under strong pressure from our customers. The improved production facilities now available have enabled the company to meet that pressure with greater success than ever before and have demonstrated the economy in the production costs of our modernized plants.

Accounts

It is gratifying to report that the trading profit after depreciation for the past year of £13,546,840 is a record for the company. The provision required for taxation has been favourably influenced by the effect of the investment allowances receivable on capital expenditure so for that reason the net profit of £4,980,211 is relatively greater than would otherwise have been the case.

One of the noticeable features in the balance sheet this year in comparison with last year is the reduction in our cash resources. This has been brought about by two causes, the principal one being the capital expenditure on our development schemes, including the strip mill; the other being the additions to raw material and other stocks required by increased production and sales during the year.

It has so far not been necessary to call on the Government loan of £50,000,000 granted for the construction of the Ravenscraig strip mill but, with the rate of expenditure rising as construction proceeds and the depletion of the cash resources which will follow taxation payments at the beginning of 1961, the need to utilize this loan will then arise.

It should be recorded that during the current year the company has spent on the strip mill and on its other development schemes £16,614,000 from its own cash resources. It is considered advisable, in view of this large growth in the value of the company's assets, to transfer £3,000,000 to capital reserve and to add a similar amount to the general reserve.

In February 1960, reductions of 10/-d. for plates and 20/-d. for sections took place in selling prices. Since then increases in the price of coal and an increase of approximately 6 per cent. in wages have also taken place, but these latter changes have not yet been reflected in the results reported.

The Board recommend that a final dividend of 10 per cent. be paid, to make a total of 16 per cent. for the year.

Subsidiary Companies
A Busy Year

The Lanarkshire Steel Company, Limited, has been very actively employed during the year. The demand for joists, both heavy and light, has been strong and is being maintained. The installation of the universal beam mill is proceeding satisfactorily and production should start in May, 1961. Thanks are due to the resident director, Mr. W. Gillies, and his staff for the way in which this major extension project is being carried through without interfering in any way with production from the existing mills.

The Clyde Alloy Steel Company, Limited, has had an exceptionally busy year and new records for sales and production have been achieved. A strong demand has extended to all sections of their plant—both rolling mills and foundries. This reflects in a gratifying way the recognition of the high standards maintained by this company in all its products.

As has been noted in previous statements, the growing market for special steels made it necessary to consider an extension to the plant engaged in their manufacture. The Hallside Works of The Steel Company of Scotland, Limited, no longer required for the production of mild steel sections, was reconstructed and control of the works taken over by The Clyde Alloy

Steel Company, Limited. The new mills installed commenced production during the year.

A large tonnage of structural steel has been required for the strip mill and other development buildings now in progress. The greater share has naturally been undertaken by our own construction company, but the remainder, which still amounts to several thousand tons, has been placed on contract with other constructional engineers. Progress has been excellent and the heavy buildings erected by the Colville Constructional Company, Limited, are well ahead of schedule. Such manufacture as takes place within our own organization is necessarily debited at cost price, so the profit made by this subsidiary during the past year has been on a lower level than would normally have been the case had it been employed on work for an outside customer.

A reorganization of the layout and equipment at the Glengarnock Works of the Colville Constructional Company devoted to welding engineering fabrication is in progress and this will facilitate the flow of production and reduce costs. Although not yet completed, it has already contributed to greater output during the year.

Demand for Sheets

The demand for sheets has been maintained at a high level and has exceeded the available production facilities in Britain. As a consequence, a revival in the demand for hand-mill sheets has followed and the works of Smith & McLean, Limited, have been well employed throughout the year. So far as present indications show, good employment should continue for some period ahead. The galvanizing section of this company has been only moderately engaged during the year. No immediate revival is anticipated.

The production of ingot moulds at Fullwood Foundry Company, Limited, has increased with our higher steel production. This efficient mechanized plant has not only had no difficulty in meeting our own requirements but has succeeded in extending its business in the export markets of Europe.

In the field of general castings, steady progress has been made in the production of S.G. and other special qualities and in finding new markets for them. A major reorganization of this section of the foundry is now under consideration to facilitate production and cheapen costs and to make provision for the expanding trade which will undoubtedly follow the future extension of industrial activity in Scotland.

Hot blast cupolas with their ancillary equipment are nearing completion and should be in production at an early date. In addition to bringing about more efficient metal melting, an extensive series of experiments has been planned for this plant in the hope that by its use low grade raw materials can be converted under proper technical control into useful products.

The work of clearing the site of the coke ovens and blast furnace plant at Dixon's Ironworks, Limited, has now been completed and the land belonging to this company has been sold.

Ravenscraig Strip Mill

This is unquestionably the most important of the development schemes which the company has undertaken and I am glad to report that progress on the 68-in. 6-stand hot mill with the breakdown mill and the accompanying slabbing mill has been maintained at a satisfactory rate throughout the year. Equally good progress has been made on the 4-stand cold reduction mill and the other ancillary plant at Gartcosh.

As is not unusual with schemes covering a large area of ground, some unexpected but fortunately not serious difficulties were encountered in local areas of the site. These areas required more piling than was anticipated, but the additional site strengthening necessary is now nearing completion.

Good progress has been made with the coke oven and blast furnace contracts and the first of the new furnaces is expected to be available for production during the summer of 1961. The decision was taken with this furnace to repeat exactly the design and dimensions to which the original furnace had been constructed as this has proved to be satisfactory.

Marked improvements have been obtained in recent years in blast furnace practice in both productivity and coke economy by the increased use of sinter. To take advantage of this, a sinter plant capable of producing 4,500 tons of sinter per day has been designed and ordered for Ravenscraig. This will be one of the largest plants of its kind in Britain.

The hot and cold mills are making satisfactory progress in the works of the builders, Messrs. Davy & United Engineering Company, Limited, and delivery of the first stands has commenced. The Board are well satisfied with the progress of the whole scheme and I am indebted to my colleagues, Messrs. Kilby, Towndrow, and Martin, for the admirable attention they have devoted to this large project.

After careful consideration of alternative proposals, it has been decided to erect a new headquarters administration building adjacent to the entrance to Ravenscraig to house the managerial and sales staff required for the strip mill operation. This centralization should ensure convenient co-operation between all sections of the works and sales staff and contribute to ease in administration.

L-D Steel Plant

Following discussion and collaboration with the holders of L-D process rights, a design for the new basic oxygen shop at Ravenscraig was developed. Before finalizing details, a team consisting of technical directors and staff visited the U.S.A. for discussions with American production experts who already had experience in this new steelmaking process, and it was gratifying to find that our designs were commended and fully accepted.

Bearing in mind the requirements of the Clean Air Act in regard to air pollution, very special attention has been paid to fume elimination during operations in this melting shop where large quantities of oxygen will be used. The necessary additions to the plant have been costly as it is estimated that the fume extraction and associated equipment will account for about 25 per cent. of the total cost of the melting shop.

Other Development Schemes

It will be recalled that in 1957 the installation of a 4-high plate mill at Clydebridge was foreshadowed to replace the present 3-high plate mill. The advent of the strip mill necessarily caused these plans to be revised since the thinner plates can be more economically rolled in a continuous mill than in a mill of ordinary type. This revision was finished last year and a carefully worked out plan for economical production has now been adopted. Contracts for the mill have been placed and the civil engineering work on the site is proceeding. The installation will be made without interfering with existing production and when in operation this plate mill will combine in one unit the total production of Clydebridge and Blochairn with a capacity of 10,000 tons per week.

At Clyde Iron Works a new sinter plant of increased capacity will replace the present sinter plant which was one of the first to be erected in this country.

A revision of the power driving the conveyor belts

at General Terminus has taken place and a substantial improvement realized in the ship discharge rate. This should materially assist in the handling of the increased intake of ore required for the additional blast furnaces at Ravenscraig.

All this activity has entailed much additional work on the staff during a year when business demands were already heavy, and the Board have greatly appreciated the successful and efficient way in which the staff have shouldered these collective burdens.

Company Organization

When the development schemes now under construction come into production a substantial increase in responsibilities will devolve on the management of the company. In anticipation of this, consideration has been given during the past year to company organization to ensure that this extension in the business of the company is effectively and efficiently supervised. The Board has therefore appointed two joint managing directors to share in the additional work which will arise—Mr. T. R. Craig will take charge as managing director of sales and Mr. R. P. Towndrow as managing director in charge of works and production. Both these colleagues have already shown during their association with Colvilles great ability and zeal in handling the affairs of the company.

With a similar purpose in mind, the appointment has been made of Mr. W. Banks as general works manager of the Ravenscraig group and of Mr. A. Young as general works manager of the Clydebridge group. In this way the management of closely related production activities has been integrated.

Developments Abroad

New Zealand—In association with two British steel companies and with Fletcher Holdings, Limited, Auckland, satisfactory arrangements have been concluded for the erection in New Zealand of a steel works to manufacture bars and light sections. Construction has commenced and it is expected that production will start early in 1962.

Iron Ore in French Guinea and Mauritania—Some years ago the development of an iron ore property in French Guinea was undertaken jointly by British steelmakers in association with French interests and carried to the stage of successful production. Another large deposit of good quality iron ore in Mauritania is now in process of development, with financial assistance from the World Bank, by an international group collaborating with an important French financial consortium. The major users of imported ore in the United Kingdom decided that the time had come to consolidate their interests in foreign orefields and the British Ore Investment Corporation, Limited, has been formed for this purpose. Colvilles has taken its appropriate shareholding in this new concern.

USA Reciprocal Agreement—I am glad to announce that an agreement for reciprocal technical co-operation with the Republic Steel Corporation, one of the largest steel producers in the United States. This agreement provides for the exchange of technical knowledge and experience in matters relating to steel products and steel production and gives to both participants a preferential opportunity to make use under licence of certain patents and trade marks in which they are interested.

In the development of the strip mill and the development of the market for strip mill products, this agreement will be of great value. Equally, it is anticipated that it will help to widen the market for some of the specialities which have been developed by Colvilles.

Future Trends

As has already been mentioned the demand for steel products throughout the year has been strongly maintained. All the mills in the group have been working at full capacity and this has naturally had a favourable influence on both costs and earnings. As the year progressed, however, some weakness showed up in the export markets, bringing in its wake intensified competition and low prices from foreign makers. This situation was paralleled by the continued dullness of the home demand in America where little sign of recovery has so far been evident. It is significant that in both the United States and on the Continent there is a growing uneasiness that the expansion of capacity has overtaken rather too rapidly the expansion in demand and that productive capacity in excess of demand had indeed already been brought into existence. This fear may or may not be seriously based, but it is a warning that must be most carefully considered.

The rate of growth in steel consumption during the post-war years has been unusually high and it has been maintained over a fairly long period. There is a natural tendency in consequence to believe that this same rate of expansion and demand will continue and to think in terms of plans to provide plant and equipment to meet it.

Before such decisions can be made, however, the influence of new factors must now be taken into account. In the field of export one must bear in mind that some of the less highly developed countries, which for many years offered an important export market, are promoting schemes for the production of their own steel in order to curtail their dependence on supplies from outside. The growth in the spirit of nationalism throughout the world is another complication which presents occasionally some little difficulty in the development of satisfactory trade relations.

To draw adequate conclusions from so complex a world situation is therefore difficult, but whatever situation develops to concentrate on lowering production costs still further must continue to be one of our major objectives.

Davy-Ashmore Board Changes

IN order to make room for promotion, Sir Walter Benton Jones, chairman of the United Steel Companies, Limited, has retired from the board of Davy-Ashmore, Limited. Mr. M. F. Dowding, general manager of the machinery division of the subsidiary, Davy & United Engineering Company, Limited, has been appointed to the board of the parent company.

As agreed in principle at the time of the Davy-Ashmore merger, Mr. C. E. Wrangham, formerly chairman of Ashmore, Benson, Pease & Company, Limited, and of P.G. Engineering, Limited, has resigned from the boards of these subsidiaries and Mr. M. A. Fiennes has been appointed chairman in his place. Mr. Fiennes is the managing director of Davy-Ashmore.

ASBESTOS PRODUCTS GROUP, Turner & Newall, Limited, Manchester, is to acquire all the share capital of Stillite Products, Limited, insulation manufacturers, of London, S.W.1. The company makes mineral wool products at Stillington (Co. Durham), and South Bank, Middlesbrough.

Export Council Launches "Operation Europe"

SERIES of fact-finding missions have been organized by the Export Council for Europe to survey the export prospects for British firms on the Continent. In all, 25 members of the council will take part and they will study the extent of foreign competition, questions of price, quality, and design, and market needs generally.

The council intends following up this month's tours with similar ones to other western European countries in May and June. The first mission will leave for Switzerland on Sunday and this will be followed by visits to Spain, Sweden, Austria, Portugal, Denmark, Italy, Norway, and France.

Among the members of this month's missions are: Sir Wiliam McFadzean, chairman of the council, president of the Federation of British Industries, and chairman and managing director of British Insulated Callender's Cables, Limited; Mr. D. le S. Campbell, managing director of Davy-Ashmore Export Company, Limited, and a director of Efco, Limited, and associated companies; Mr. G. H. W. Cullinan, director, Shell Chemical Company, Limited; Lord Ebbisham, president of the London Chamber of Commerce; Mr. J. L. Gormezano, executive director of Hawker Siddeley Brush International, Limited.

Sir Kenneth Preston, chairman of Stone-Platt Industries, Limited; Mr. W. H. G. Roach, managing director of William Press & Son, Limited; Mr. D. G. Stokes, managing director of Scammell Lorries, Limited, and a director of Leyland Motors, Limited; Mr. P. F. D. Tennant, oversea director of the FBI; Mr. C. R. Wheeler, president of the British Iron & Steel Federation, chairman of Guest Keen Iron & Steel, Limited, and a vice-chairman of Associated Electrical Industries, Limited; and Mr. G. H. Garner, head of the west European department of the FBI.

Sir James Hutchison, president of the Association of British Chambers of Commerce, and chairman of Grampian Holdings, Limited; Mr. R. W. Weekes, managing director of the Harland Engineering Company, Limited; Dr. A. Caress, a director of Imperial Chemical Industries, Limited; Mr. A. J. S. Brown, a director of Stone-Platt Industries, Limited; Mr. O. F. Reichwald, managing director of Daniel Adamson & Company, Limited; Mr. J. Hugh Neill, deputy chairman and joint managing director of James Neill & Company (Sheffield), Limited.

Mr. Hector McNeil, managing director of Babcock & Wilcox, Limited; Mr. J. C. Snow, a director of Snow & Company, Limited; Sir Robert Maclean, chairman and managing director of A. F. Stoddard & Company, Limited; Mr. E. W. Senior, commercial director of the British Iron and Steel Federation, and chairman of George Senior & Sons, Limited; and Sir Norman Kipping, director general of FBI.

Steady Rise in East-West Trade

ACCORDING to the latest returns from the Board of Trade, Britain's trade with the Eastern Communist countries rose to £293,000,000 in 1960 from £233,000,000. There has been a steady growth since 1950 when the UK exported goods worth £108,000,000 to the eastern block.

Among the most striking individual items exported last year were copper worth £8,800,000 to China, machinery worth £20,000,000 to the USSR, and industrial machinery worth £5,000,000 to Poland.

Recent Wills

CURRY, J. V., former industrial relations director of the North-Eastern Divisional Coal Board ... £11,365

COOPER, WILLIE, for some years undermanager at Furnace Hill and Renishaw Park Collieries, and later safety officer at Orgreave Colliery, Handsworth, Sheffield ... £1,691

RICHARDS, G. A., mining and explosives engineer, and a director of Ripley Engineering Company, Limited, and Walker Richards Explosives Company, Limited ... £8,418

MENGEL, E. C., former chairman of Humphreys & Glasgow, Limited, consultants and contractors to the chemical, oil, and gas industries, of London, S.W.1 ... £62,328

ASQUITH, W. S., a former director and a son of the founder of William Asquith, Limited, member of the Asquith Machine Tool Corporation, Limited, Halifax ... £115,922

WALLACE, WILLIAM, manager of Granville Colliery, Woodville (Staffs), and president of the South Midland branch of the National Association of Colliery Managers from 1945-46 ... £3,089

NICHOLLS, V. L., managing director of Grazebrook Foundry, Limited, and a director of M. & W. Grazebrook, Limited, heavy general and chemical engineers, both of Dudley (Worcs) ... £24,364

REES, COL. H. T., chairman of D. Morgan Rees & Sons, Limited, wire rope manufacturers, of Cardiff, and a former director of the North Rhondda Colliery Company, Limited ... £81,436

BARRIE, GEORGE, former chairman of Barclay, Curle & Company, Limited, shipbuilders, repairers, and engineers, of Glasgow and a past president of the Shipbuilding Employers' Federation ... £15,887

HETHERINGTON, A. L., former assistant secretary of the Department of Scientific and Industrial Research and administrative adviser to the British Coal Utilisation Research Association ... £39,667

DUTTON, C. F., who retired in January from the post of assistant director of marketing (by-products) of the National Coal Board. He was a past president of the Association of Tar Distillers £11,737

WOOD, G. A., manager of the electric melting departments at Sheffield and Openshaw of the English Steel Corporation, Limited, until he retired in 1955, and a Fellow of the Institute of Metallurgists ... £9,137

PARKER, WILLIAM ERNEST, founder director of British Rolling Mills, Limited, Tipton (Staffs), and a former director of Audley Engineering Company, Limited, valve makers, of Newport (Salop) ... £50,180

WEIR, SIR CECIL MCALPINE, head of the United Kingdom Delegation to the High Authority of the European Coal and Steel Community, 1952-55, and chairman of International Computers & Tabulators, Limited ... £36,687

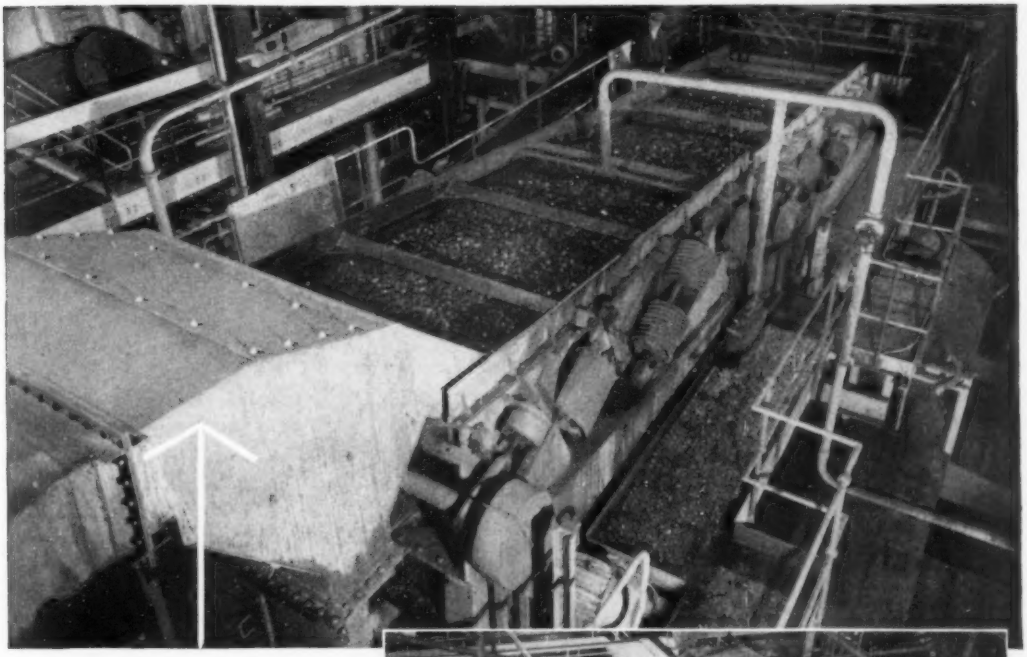
HARGREAVES, D. W., retired mining engineer and for many years a member of the National Association of Colliery Managers; from 1912 to nationalization, manager and later agent/manager of Water Haigh Colliery (Yorks) ... £64,249

VITAL MILL HOUSINGS FOR RAVENSCRAIG SUNK

DESCRIBED by a company engineer as the key to the whole strip mill which Colvilles, Limited, is building at Ravenscraig, two steel mill housings—each weighing 144 tons and measuring 38 ft. long—are lying under 90 ft. of water in the Mersey Estuary. They were part of the cargo of a coaster which was sunk in the river following a collision.

It is hoped to be able to recover the housings, which were on their way from Davy & United Engineering, Limited, at Sheffield, where they had been sent for precision machining. Salvage vessels have passed cables under the sunken vessel and the housings, among the biggest and heaviest of their kind in Britain, and which were not damaged by the accident, should be raised in a month or six weeks. A Colville's spokesman said that there would have to be a certain amount of reorganization in completing the slabbing mill, but if the housings were delayed no more than a month the whole job should be completed on time.

WEST'S (MANCHESTER) LIMITED



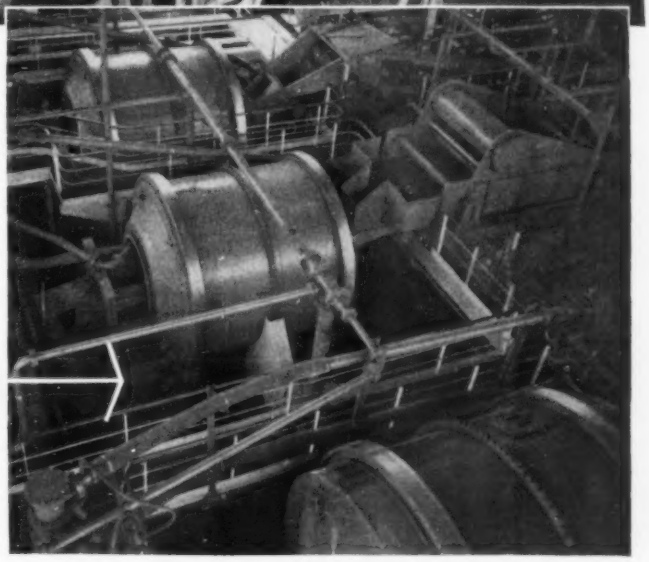
WEST-FLÄMRICH

HIGH-INTENSITY

SCREENS

Run-of-mine scalping. Raw coal pre-sizing. Washed coal dewatering/sizing. Dense medium drain and spray. Final sizing. Slack and slurry dewatering. Coke scalping, grading and debreezing.

Photograph of Flämrich Screens by courtesy of the National Coal Board



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for Dense Medium Separation

Drum Separators. DMS Laboratory Units. Coal Spirals. Froth flotation cells. Densifiers and thickeners.

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CL21

CURRENT PRICES OF IRON AND STEEL

(Delivered, unless otherwise stated)
February 2, 1961

PIG-IRON

Foundry and Forge Iron.—No. 3 iron, Class 2, Middlesbrough, £21 17s.; Birmingham, £21 9s. 3d., 10-ton lots or over.

***Low-phosphorus Iron.**—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

***Basic Pig-iron.**—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

Hematite.—Si less than 2%, S & P 0·03-0·05%, 10-ton lots or over; N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s.; Birmingham, £25 13s.; Wales (Welsh iron), £23 19s.

Refined.—Cylinder and refined irons, South Zone, £25 9s., North Zone, £25 6s. 6d. Refined malleable, max. 0·10% P, South Zone £26 9s., North Zone £26 6s. 6d.

MANUFACTURED IRON

(Bar basis, 2⅜ in. to ¾ in.)

CROWN IRON: England and Wales (Zone 1), £50; Scotland, £49 15s.; Ireland, f.o.q. Belfast, £53; all other Northern Ireland ports, £54, f.o.q. Cable iron, £1 extra.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 100 tons and over, £32 5s. 6d.; hard (0·41-0·60% C), 50 tons and over, £33 17s.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting steel up to 0·25% C, 50 tons and over, £35 4s. 6d. SIEMENS-MARTIN ACID (50 tons and over): Up to 0·25% C, £40 11s.; silico-manganese, £43 4s.

Billets, Blooms, and Slabs for Forging and Stamping.—Lots of 50 tons and over. Basic, soft, up to 0·33% C, £37; basic, hard, over 0·41 up to 0·60% C, £38 2s. 6d.; acid, up to 0·25% C, £41 14s.; acid silico-manganese, £44 17s.

Alloy Steel (25 tons and over).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £46; Ni 2·75/3·75%, Cr 0·5/1·10%, £72 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo. 0·2/0·65%, £83 7s. BARS: 1 in. dia. and up, nickel, £66 7s.; nickel-chrome, £97 1s.; nickel-chrome-molybdenum, £109 14s.

Other Semi-products, etc.—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, 50 tons and over, £39 10s.; shell steel billets for direct forging, up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, 50 tons and over £39 17s.; hard basic, 50 tons and over, £43 8s.; free-cutting, up to 0·25% C, 50 tons and over, £45; acid, up to 0·75% C, 50 tons and over, £54 6s. 6d. Stainless steel billets, 3 in. and larger, 10 tons and over, Austenitic, £219 10s.; martensitic, £131 10s.

FINISHED STEEL

Heavy Products (50 tons and over).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £40 7s.; medium plates, all areas of England and Wales, £43 16s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £42 17s.; floor plates, N.-E. Coast, £41 16s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 1s. 6d.; bars (rounds and squares), £40 11s. 6d.; flats, £38 6s. 6d.; joists, £37 17s. 6d.

Rolled and Re-rolled Steel Products.—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £44 9s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 12s. 6d.; spring steel, basic, £44 4s. 6d.; spring steel, acid, £53 11s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

Sheets and Strip.—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. Cold-rolled steel strip, coils, hard temper, not annealed, 20 tons and over, £54 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

Tinplates.—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t., makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

Colliery Rails and Arches.—Arches, 4 in. × 2½ in. × 2 in., re-rolled, £38 15s.; 3 in. × 3 in., re-rolled, £39; 3½ in. × 3½ in., re-rolled, £40 7s. 6d.; 4 in. × 2½ in. × 2 in., prime £43 7s. 6d. Other sections, prime, £43 12s. 6d. Extra fish-plates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled, £37 9s.; 3 in. × 3 in., re-rolled, £37 11s. 6d.; 3½ in. × 3½ in., re-rolled, £38 18s. 6d.; 4 in. × 2½ in. × 2 in., prime, £42 4s. 6d. Other sections, prime, £42 7s. Benk bars, standard type, prime material, all thicknesses, £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s. Standard type, re-rolled, up to ⅜ in., inclusive, £36 3s. 6d.; over ⅜ in. to ½ in., inclusive, £37 8s. 9d. "W" type bars, re-rolled, up to ⅜ in., inclusive, £38 13s. 6d.; over ⅜ in. to ½ in., inclusive, £39 18s. 6d. Light rails, flange, 25 lb. and under, prime, £40 17s. 6d. Flange rails, 25 lb. and under, re-rolled, £39 15s. Fishplates, £50 12s. 6d.

Bright Steel (50 tons and over).—Bars, no analysis or test, £53 5s.; flats, untested, £70 16s. 6d.

High-speed Tool Steel.—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d.; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

Rails, etc.—F.B. rails, heavy 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and heavier, 50 tons and over, f.o.t., £55 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over £50 12s. 6d.

BLAST-FURNACE COKE

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DURHAM AND NORTH-EAST COAST: 177s. 6d. SOUTH WALES: 174s. 7d. NOTTS AND DERBY: 150s. 7d. LANCASHIRE: 162s. 7d. STAFFORDSHIRE: 156s. 2d. YORKSHIRE: 155s. 1d. SCOTLAND: 187s. 11d.

(All prices are subject to quality differentials.)

STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

	Scotland.	N.-E. Coast.	Midlands.	Sheffield.	Lancs.	S. Wales (East)	S. Wales (West)
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Heavy steel scrap*	229 3	228 3	220 0	226 3	226 3	227 3	232 3
Heavy mixed scrap*	207 3	206 3	198 6	204 3	203 9	205 3	210 3
Heavy steel turnings†	179 9	179 0	169 9	176 9	174 3	177 0	180 0
Heavy cast iron†	206 9	203 9	208 0	204 3	189 3	199 3	205 9
Cast-iron borings†	160 3	157 3	157 0	159 9	157 3	159 6	164 6

* Not less than 500 tons delivered within three months.

† Not less than 250 tons delivered within three months.

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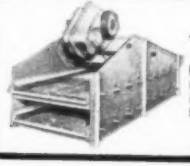
Quality-built VIBRATING Screens

They're engineered to endure!



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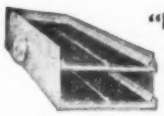
Horizontal or part inclined for installations with limited headroom.



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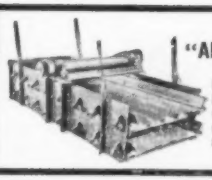
Ruggedly built inclined screen for normal or extra heavy duties.



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Light duty, inexpensive screen for specialised applications.

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal Trades Review, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATIONS VACANT

Progressive Company in the mining equipment field seek to appoint a

SALES MANAGER.

POTENTIAL candidates, who must have had previous Sales Management experience, should be in the 35-40 age group and possess strong personality, energy and good appearance.

If you fulfil the above requirements and have in addition

(1) Previous experience of selling to the N.C.B.

(2) Underground Management experience.

(3) Ability to deal personally with Senior Executives.

(4) Ability to direct and control existing Sales Force.

Apply, giving full details of career to date, to Sales Director, Box PC376, Iron and Coal Trades Review.

COUNTY BOROUGH OF DONCASTER EDUCATION COMMITTEE.

DONCASTER TECHNICAL COLLEGE.

Principal: W. LOMAX, M.Eng., B.Sc., M.I.Min.E.

REPEAT ADVERTISEMENT

APPLICATIONS are invited for the post of full-time ASSISTANT TEACHER of MINING and SURVEYING subjects in the Mining Department. Candidates should possess as a minimum qualification a Colliery Manager's Certificate and/or a Mine Surveyor's Certificate and should preferably hold a University Degree in Mining or equivalent. Some teaching experience is desirable.

Salary will be in accordance with the Burnham Technical Scale, Grade B, commencing salary will be dependent upon industrial and teaching experience. Successful candidates will be required to commence duty as soon as possible. Persons who replied to the previous advertisement need not repeat their application.

Application forms may be obtained from the undersigned and should be completed and returned as soon as possible.

V. H. HOSKIN,
Chief Education Officer.

Education Offices,
Whitaker Street,
Doncaster.

SITUATIONS VACANT—*contd.*

ENGINEERING DRAUGHTSMEN

DRAUGHTSMEN are required for design work on mechanical engineering projects which include structural steelwork, and applications are invited from men having suitable experience of medium/heavy engineering. The Company is principally engaged in the manufacture of a wide range of capital equipment (mainly for mines) and consequently the design work is varied and interesting. New products at present being developed include an underground self-propelled vehicle and an extensive range of pneumatic equipment.

There are four design offices specialising in: mine car handling equipment, skip winding equipment, materials handling, pneumatic and hydraulic equipment; draughtsmen have the opportunity of transferring from one office to another. These design offices are divided in small sections each usually having two draughtsmen and one or two apprentices, headed by a Section Leader.

An attractive salary scale is offered, actual salaries paid being in accordance with ability and experience and are subject to annual review. The working week is five days with overtime paid extra. There is a pension scheme.

Applicants should have served a recognised apprenticeship and have obtained O.N.C. in mechanical engineering.

When making the initial application, please give brief details of experience and qualifications.

Qualter, Hall & Co. Ltd.,
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PROGRESSIVE Company with expanding interests in the mining equipment field has vacancy for SALES ENGINEER in the SCOTTISH COALFIELD.

Preference will be given to candidates with previous sales and underground management experience.

This is a permanent progressive appointment, with car and expenses provided. A superannuation scheme is in operation.

Reply, giving full details of previous experience, to SALES DIRECTOR, Box PC374, IRON AND COAL TRADES REVIEW.

SITUATIONS VACANT—*contd.*

THE UNIVERSITY OF LEEDS.
DEPARTMENT OF MINING.

APPLICATIONS are invited for appointment as LECTURER or ASSISTANT LECTURER IN MINING at a salary on the scale £1,050 × £50—£1,400 × £75—£1,850 (efficiency bar at £1,550) a year for a Lecturer, or within the range £800—£950 a year for an Assistant Lecturer according to age, qualifications and experience. Applicants should have a University degree and experience in the design and application of modern coal mining machinery; those with electrical engineering qualifications who have the necessary experience will also be considered. Applications (three copies) stating date of birth, qualifications and experience, together with the names of three referees, should reach THE REGISTRAR, THE UNIVERSITY, LEEDS, 2 (from whom further particulars may be obtained) not later than 17th February, 1961; candidates overseas may apply in the first instance by cable, naming three referees, preferably in the United Kingdom.

NATIONAL COAL BOARD.

Divisional Mechanical Engineer.

REQUIRED by National Coal Board, Northern (N. & C.) Division, Whitley Road, Longbenton, Newcastle upon Tyne, 12. Applicants should have had extensive practical experience of colliery mechanical plant and equipment and must be fully conversant with the design, installation, operation and maintenance of surface and underground mechanical plant and machinery. They should have held previous posts requiring engineering administrative responsibility. Corporate membership of an appropriate professional body, or an equivalent technical qualification, is desirable. Salary within range £2,250—£3,000 p.a. Applications giving date of birth and full details of education, qualifications and experience to STAFF DIRECTOR at the above address by 14th February, 1961. Please quote: M/2.

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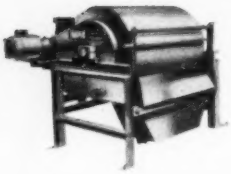

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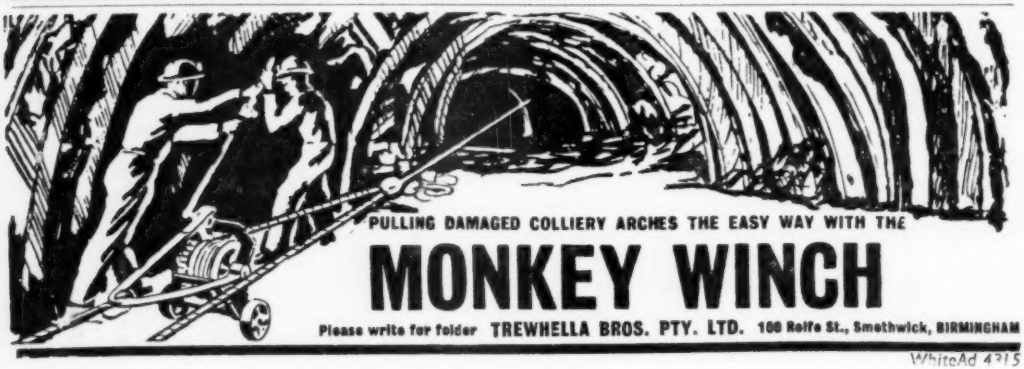

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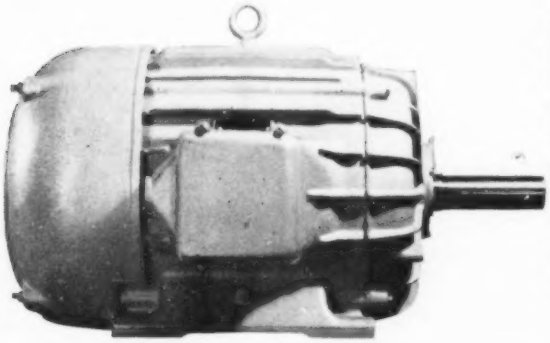

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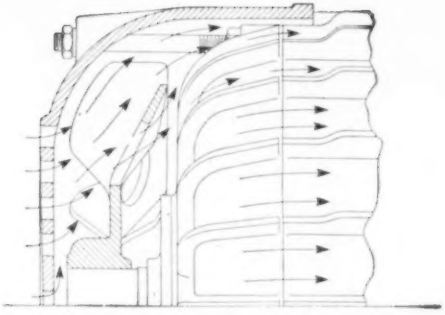

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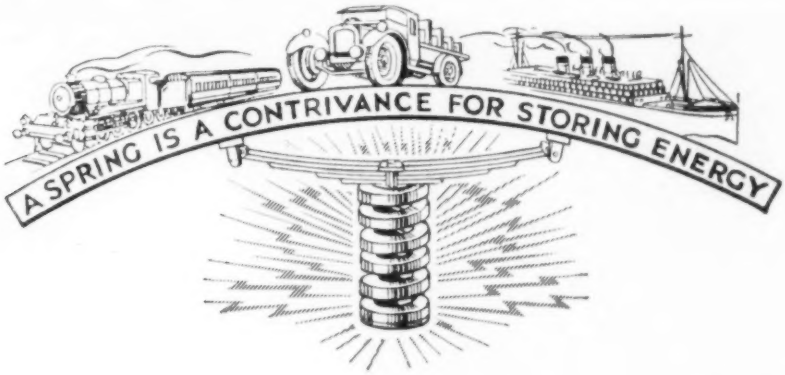

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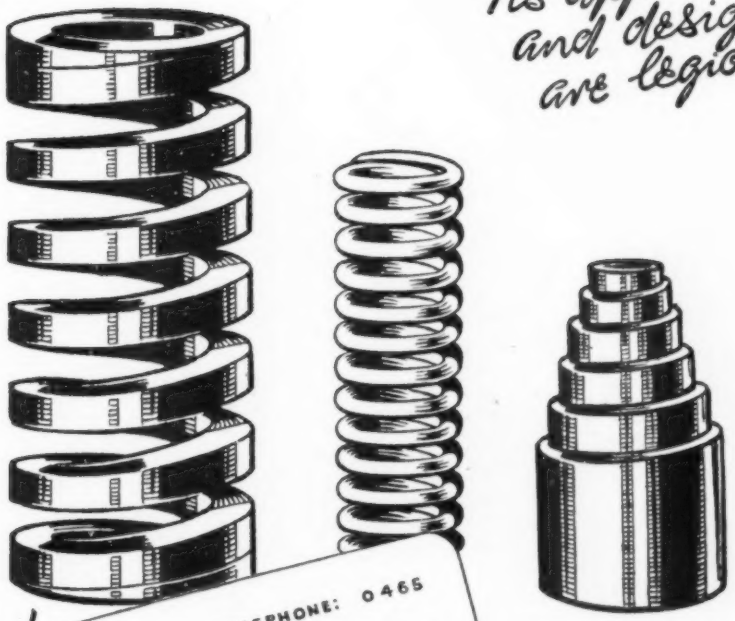

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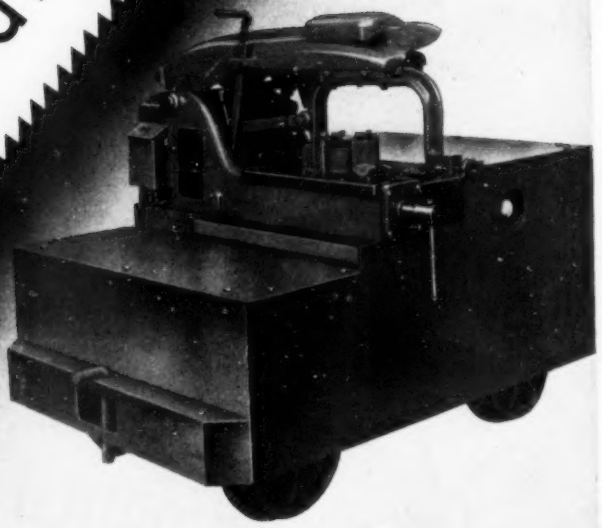

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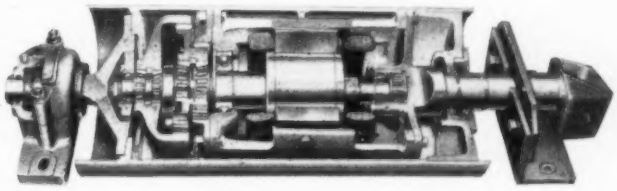

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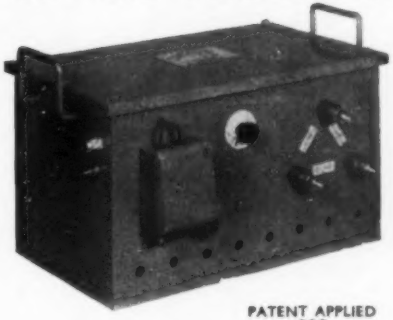

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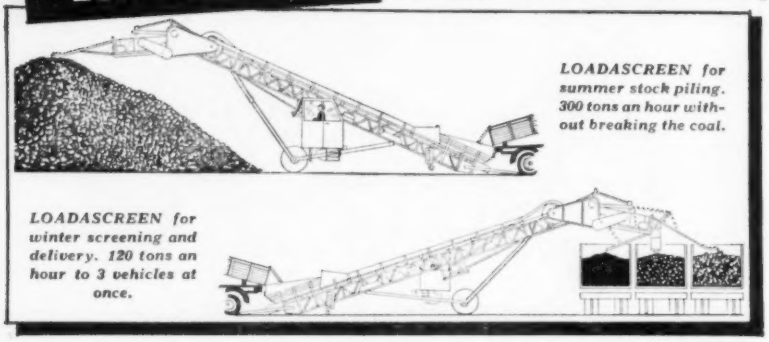

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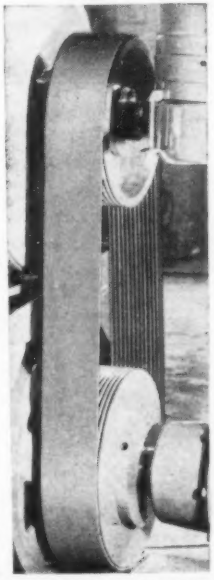

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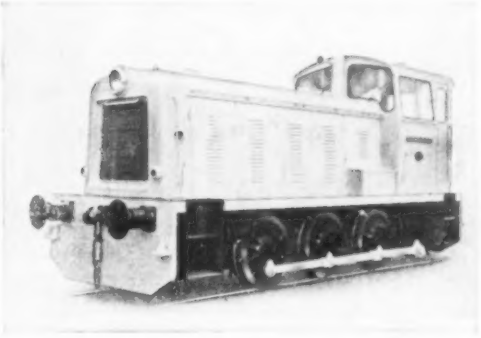

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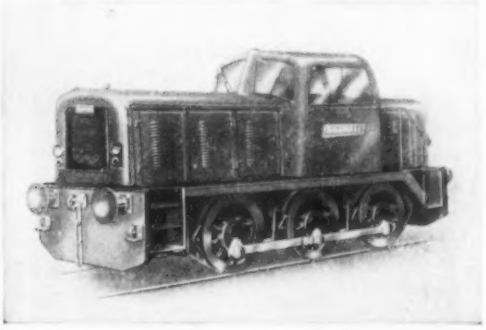

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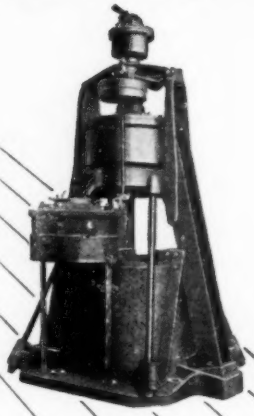

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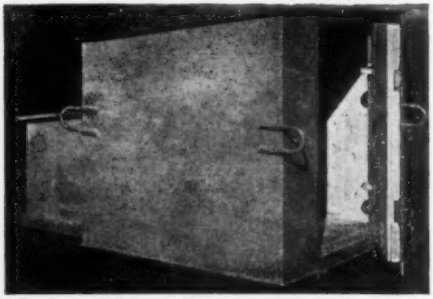

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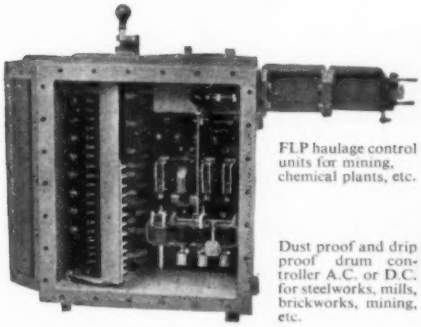

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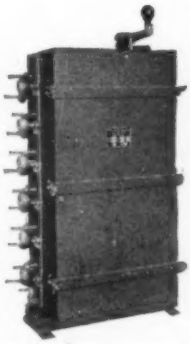

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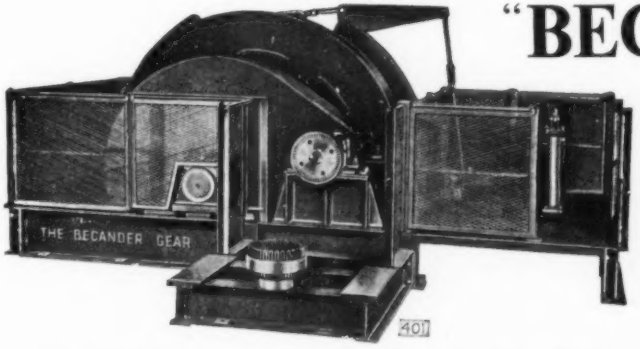

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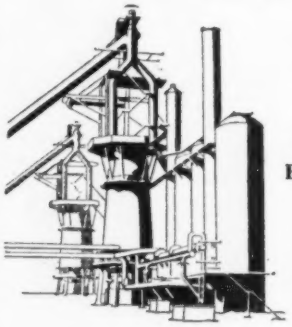

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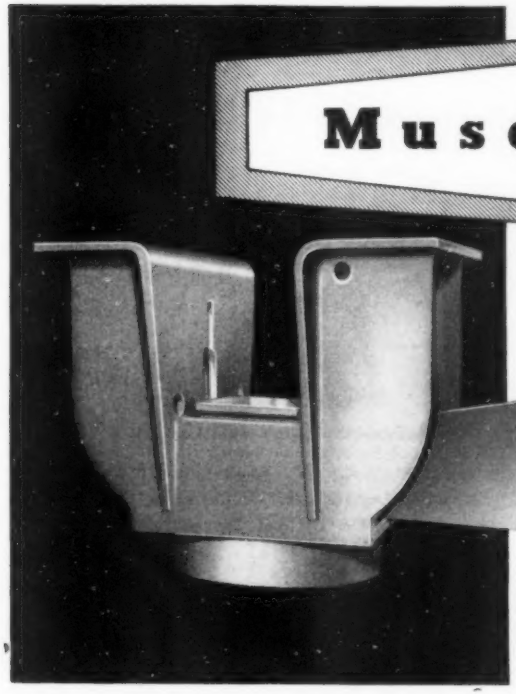

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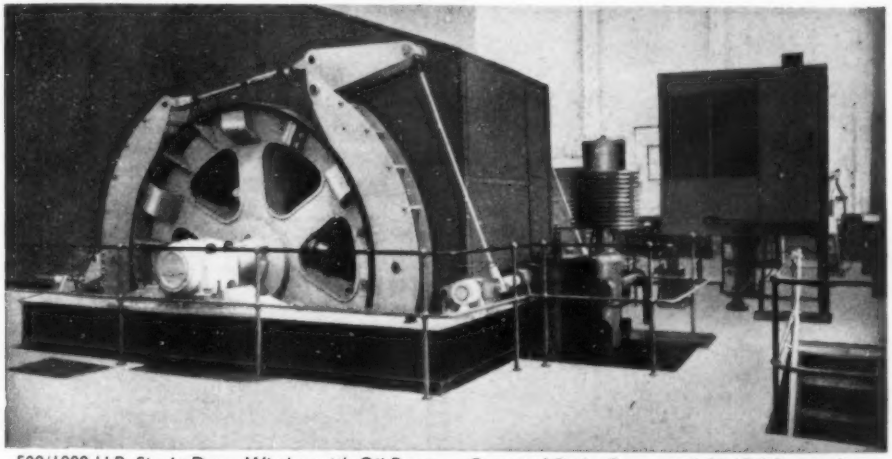

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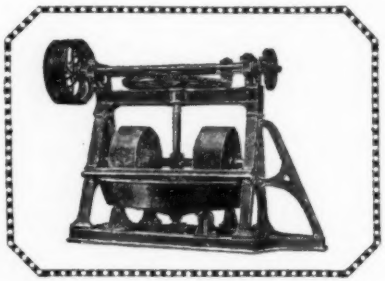

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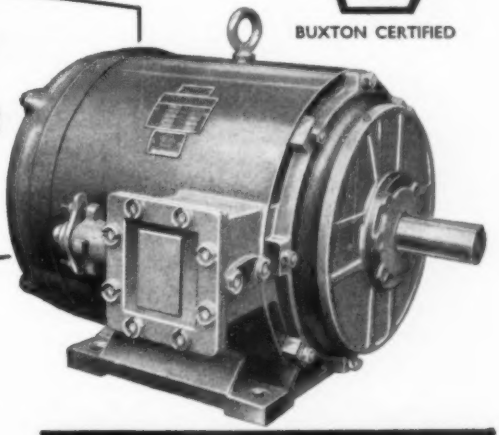

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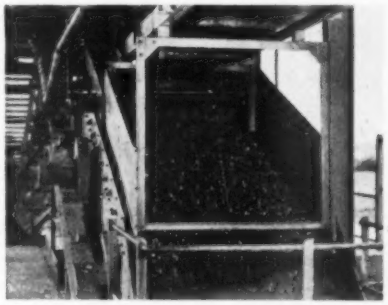

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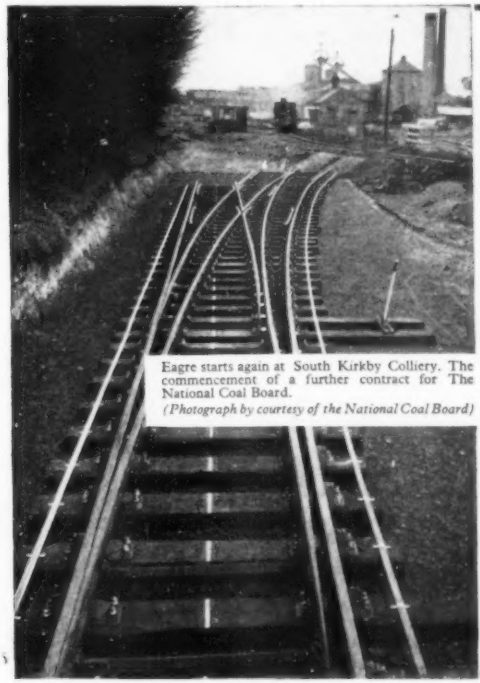

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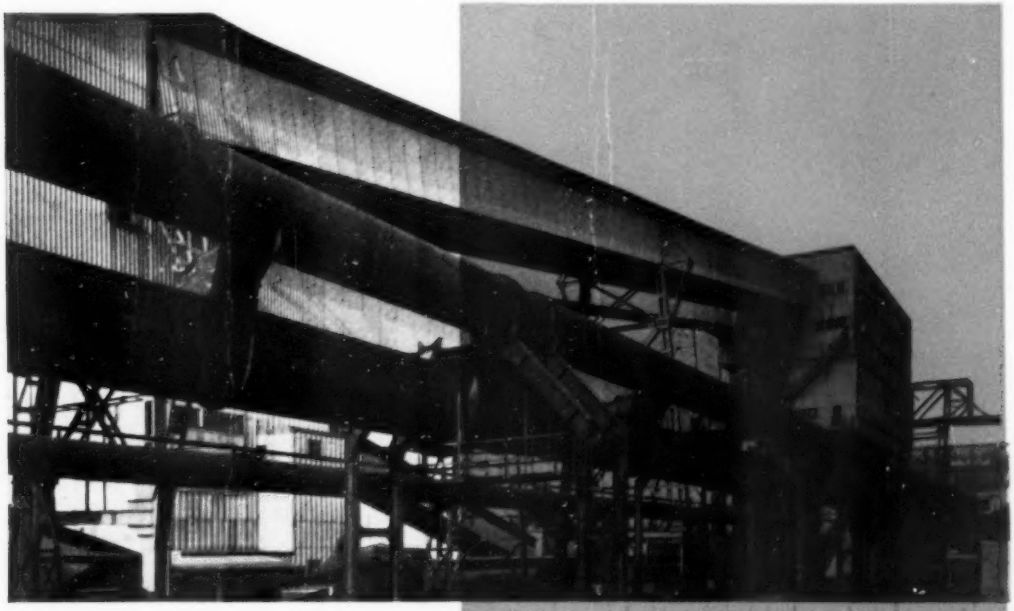

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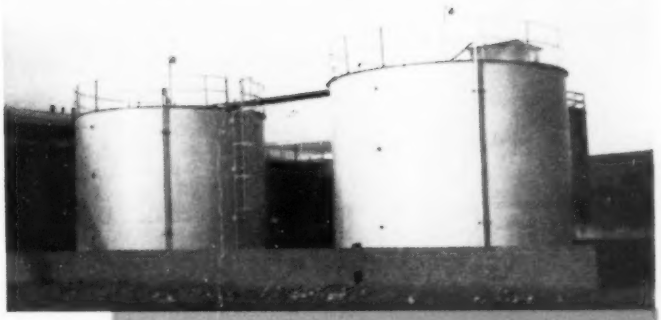

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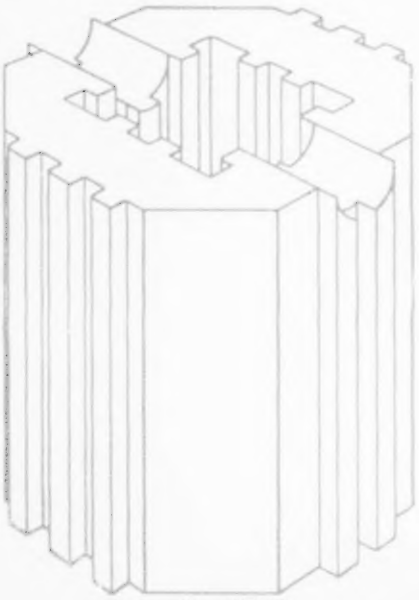

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